CHEMICAL MARKETS

Vol. XXXII — January, 1933 — No. 1.

"The" Problem

Since nobody else has a solution, it may be unfair to blame Technocracy for having failed to present a solution for the economic problem to which they have called attention. But since they have so effectively caught the public attention, it is a pity indeed that they did not more clearly state just what that problem is. It is a very real problem, one that a great many have long recognized, and one that involves forces sufficient seriously to disarrange the present economic scheme of things.

Until half a century ago, as far back as history records, there have been panics caused by shortages. Recently, and with increasing severity, the economic machinery has jammed because of surpluses. In this country, at least, we have a machinery of production for all sorts of raw materials and finished products, that if worked even at reasonable rates are capable of over-supplying our ability continuously to buy them. This in spite of the fact that their costs of production have been coming down steadily through the ages, largely during the past thirty years because the investment in machinery has been increased greatly, but less than the saving effected in labor costs.

Our present economic system distinctly promotes continuous improvement of processes with a continuous reduction in labor, and carried to its ultimate conclusion leads to growing unemployment and eventually to pauper labor.

The essence of the problem, therefore, is how we are to maintain a price profit system of economics; reduce costs as is necessary in competition, and yet maintain a buying power among the great bulk of our working population so they may be able to purchase the output of the machines.

Planned economy and socialism might do it if we were wise and brave enough. Sharing work, or shorter hours will only work if the wage scale is raised proportionately. Unemployment insurance will alleviate distress but not cure the cause. And there are a host of quack remedies proposed that a moment's clear thought show would merely make confusion worse confounded.

Mr. du Pont's Statistics Theorizing without facts is nowadays a popular pastime. Its opposite, fact-finding without theory, is an extremely rare mental process today. Therefore, when Lammot du Pont at the luncheon given in his honor at the Chemists' Club, presented a few very simple figures and allowed his hearers to draw their own conclusions, it is not remarkable that he stimulated some real thinking. This tremendously effective method was made the more impressive by the timeliness of the theme chosen, by the unexpected character of the facts which were brought forth, and by the clarity and directness with which anyone may apply them to what most of us find is an exceedingly complicated and difficult matter.

The conclusions to be drawn from Mr. du Pont's statistics (his address will be found on another page of this issue) are very implicit. Many of the arguments for what might be called an internationalistic policy for the United States are not based upon facts.

In a general way most Americans appreciate that our total exports are but an unimportant trifle in the volume of our national business, and anyone who has examined the Hawley-Smoot tariff knows that it increased the duties of the old tariff very much less than is popularly believed. But Mr. du Pont jolted his hearers by pointing out some common, current allegations that are certainly based upon very shaky foundations.

Our present tariff can hardly be accused of barring the door to our European creditors, since in the first place it raised the tariff on non-agricultural goods only 3 per cent.(against 10.9 on agricultural goods) and furthermore, although the dollars value of our foreign business has fallen to 54 per cent. the unit value, that is the tons, gallons, yards, etc., was in 1931, 98 per cent. of the 1923-25 totals. We have ourselves pointed out that the decline in American foreign trade, both import and export, has not been disproportionate with the slump in world trade during the past three years, and so not wholly chargeable to our tariff.

The United States has been so often accused of hoarding gold, and so upsetting international credits, that it comes as a surprise to learn that our share of the world's monetary gold is today less than it was in 1912, and that more than this, that we have the smallest gold reserve against bank deposits of any of the first class industrialized nations.

Mr. du Pont deserves thanks for having brought so clearly to light the facts behind such important statements. He has done similar good work regarding government expenditures. We should like to have him apply himself to a like task for technological unemployment, for research and industrial obsolescence, for the patents situation, to mention but three present problems that are sorely in need of more fact-finding and less theory-spinning.

Wanted: 259,849 Mussolinis That, so one of the vice presidents of one of our large chemical corporations recently announced, is the sure cure for our economic woes.

Business must rescue itself. It is the only agency big enough to break the jam. What business needs is clean-cut decision and definite action. Casting about for outside help; waiting for something to turn up; investigating causes and hesitating to go after results—all the familiar symptoms of fearful indecision, these will not begin to restore business activity. The start must be made by our individual units, and he arrived at the need for 259,849 business dictators by taking the number of corporations which in 1927, a good average year, earned dividends.

It is easy to sympathize with this point of view. This vigorous executive was obviously "fed up with the war." For years he was the active head of a smaller company which he ably administered with the aid of a few tested assistants. Since merger, he and his organization have become cogs in a greater, slower machine, and by training and temperment he chafes under the reports and conferences, the delays and the politics, that are the ritual of the worship of the great god Company Policy.

And, though this is a personal expression, it voices a just criticism of our modern industrial organization. It probes unerringly the sore spot in an infection that distresses many of the functions of American business today.

Spurious Distributors "Too many local distributors of industrial chemicals" is a familiar complaint. In almost every chemical consuming territory, this has long been a fact, partly because it is neither a difficult business in which to embark, nor one which requires a great deal of capital. Apparently, some producer is always ready to supply any new distributor with goods for sale. As a result of this super-competition, this field is always over-crowded.

The natural excess of local chemical dealers is bad enough, and even in the best times disturbs the local chemical markets. In times like these, however, it is especially hazardous to stability to have pseudo-distributors selling chemicals. And yet, during the past few months, there has been a very large increase in the local competition from firms which are not real chemical distributors, but which are most certainly chemical consumers. Their own chemical requirements are curtailed and they are attempting to recoup losses by taking advantage of their quantity contracts to peddle their surplus chemical supplies. At a number of points, and particularly in the alkali division, this situation is acute today.

It is a very serious situation. It threatens the business of the established, legitimate chemical dealers, and if allowed to continue will eventually hurt the business of the producers. The consumption of chemicals in any local market is a fixed quantity which we have all proved time and time again will not be increased by price cutting. To wink at the consumer who pushes chemicals out his back-door in competition with the manufacturer's own sales agent is a policy that leads straight to price demoralization. Fortunately, the situation can be brought under control. How these spurious chemical dealers work is well known, and who they are is easily ascertained. The evil stops short the moment the supply of chemicals for sale through unorthodox channels is cut off at the source.

Barter a la Mode Chile, in desperate straits financially, has attempted to strengthen her internal fiscal structure by placing embargoes against money shipments out of the country. American firms exporting to Chile are experiencing great difficulty in making satisfactory financial arrangements, and within the past two weeks, a large American rubber company has been attempting to sell 8,000 tons of Chilean nitrate, presumably taken in exchange for automobile tires. Chile, shut off from sales of copper and nitrate in the same quantities as she formerly enjoyed in this country, would do well to have American companies with money tied up in that country exert pressure here sufficient to move material. That every American exporter to Chile will become a seller of nitrate is a far-fetched conclusion, still the problem has interesting possibilities. France has made an arrangement whereby at least twenty-five per cent. of her nitrate purchases from Chile will be charged against frozen French credits.

What is happening has already happened throughout many countries in Europe, and in order to carry on any international trade, great barter bureaus have been established in London, Paris and Berlin, which are operating successfully. The story has been going the rounds of a deal recently negotiated in London, whereby a cargo of cyanides for Greece was exchanged for a cargo of cigarette tobacco; exchanged for a cargo of textiles from Germany; exchanged for a cargo of wood pulp from Scandinavia, which was delivered in England, and the money transferred to the original shipper of the cyanides. This seems fantastic, but it is a fact, and it shows how supply will reach demand even over the barriers designed to prevent the exchange of gold.

Quotation Marks

The United States is on the threshold of an era of sounder and more enduring prosperity. Deflation has forced American industry to put its house in order. Foolish theories and fantastic dreams have been abandoned. Our people have come down to earth and are ready to go.—*Floyd W. Parsons.*

All conscientious and farseeing Germans, in fact, realize that Europe is doomed if the French and Germans do not work economically together, and this fact must not be overlooked by those Europeans who are only conscious of the vituperative clamors of a noisy minority.—*British Trade Review.*

A man who buys crude rubber in the New York market this year gets for his dollar almost nine times the quantity of rubber that he could have bought with the same dollar in 1923. But the seller of the rubber receives only 11 cents as compared with one dollar in 1923.—*The Rubber Age.*

There will never be any such thing as general over-production until every Hottentot can live like a king. —*Sir Arthur Salter.*

Fifteen Years Ago

(From our issues of January 1918)

Merck increases capital from $250,000 to $1,000,000.

U. S. I. acquires distillery in Peoria with plans for reconstruction and improvement of the plant for manufacture of chemicals.

Haas Bros., N. Y., report losses of 300 flasks of quicksilver by three different railroad shipments.

E. I. du Pont de Nemours & Co. purchase land in Chicago for plant for dyestuffs manufacture.

Ellwood Hendrick's book "Everyman's Chemistry" published.

Heller and Merz, Newark, chemicals, dyes, etc., incorporated with capital stock $1,500,000.

Rowland G. Hazard, chairman board of Solvay Process Co. and the Semet-Solvay Co. dies at Santa Barbara, Cal. in 64th year.

Conditions and Chemicals

Tariffs, Debts, Exchange

By Lammot du Pont

I CHOSE for my subject the effect of "conditions" upon the chemical industry. I am not going to discuss the weather conditions or the astronomic conditions, but I am talking about the conditions that everybody is talking about today. Those are, I think, principally three: The payment of debts, the barriers to international trade, and exchange or gold.

That is a big contract. I do not intend to tell you much about any of them but I want to give you a few thoughts on these subjects in the hope that it may stimulate your better minds to solutions of the difficulties of the chemical industry under these economic forces.

Pre-War Conditions of Industry

In order to get the incidence of these conditions upon the chemical industry it seems to me important to get in our minds what the present chemical industry is. Let us go back to before the war. We did not have a general chemical industry. It is true that we manufactured in this country a number of chemicals in great quantities. They were largely, if not entirely, heavy chemicals, cheap chemicals, that is, those that would not bear ocean transportation and its cost. The war came along. There was a change for several reasons. First, there was a demand for the chemicals required in munitions; second there was a demand for chemicals that we could not get because the importations were stopped; third, and most important of all, there was a realization on the part of the American public that they were dependent for very important things upon other countries and they did not propose to remain so dependent and lay themselves open to the chance of being caught again.

There was therefore, a popular demand on the part of thinking people to create a real chemical industry in this country. What did they do? They put on a tariff. They even put on an embargo. They did everything that was possible and everything that was necessary to protect the chemical industry which they expected to have created. It was created.

It is a safe statement that chemically we are now practically ninety per cent. self supporting. Let us examine a few figures to determine whether we have become chemically self supporting taken from the United States Government statements and reports. The exports for the years 1910 to 1914 were 2.2 per cent. chemicals. That is the chemical grouping by the Government reports. That is the average of 1910 to 1914. In 1931 they were 4.2 per cent. chemicals. That is, the percentage of chemicals in the exports of this country had almost doubled.

The imports from 1910 to 1914 were 5.2 per cent. of the total imports. In 1931 the chemicals were four per cent. of the imports. In other words during this period from 1910 or thereabouts to 1931, the exports for chemicals had very largely increased and the imports had decreased. There is only one conclusion: We became very much more important chemically than we had been before. This chemical industry as I say was built up by protection.

A new factor is now injected into the situation. We hear a terrible row about this iniquitous tariff. We hear about the awful effects of it. When you pin a fellow down to these awful effects he will tell you they fall into three categories; first, our tariff stifles our foreign trade and kills the farmer; second, it prevents the payment of foreign debts to us; third, it ruins foreign exchange and draws all the gold from the world into the United States.

The 1930 Tariff

Let us examine these three terrible results of this iniquitous tariff, the tariff of 1930.

Let us see first what our export trade amounts to. In order to show that, I will give you a few figures, which I selected with a particular purpose in mind. I have taken that period in our recent history which you will all agree with me was a very prosperous period. We wish we were back there from 1927 to 1929. We certainly had prosperity then.

At that time, our exports expressed in dollars were six per cent. of our national income. If you take the

six principal European countries you will find that their exports were 27 per cent. of their national incomes respectively; and if you take the five important South American countries you will find that their exports were 39 per cent. of their respective national incomes. Our export business is not an important item at all, that is, not important as compared with our general industries.

Let us see now what this iniquitous tariff of 1930 really did. The former tariff assessed duties on a number of commodities. The average of all these duties, that is, if you take the import duty collected and divide it by the dollar value of all the imports, both those dutiable and those not dutiable, you will find that the average duty was 13.8 per cent., not scandalously high. That was the old tariff.

Increase Slight in New Tariff

The new tariff made it 16 per cent. We raised the tariff from 13.8 to 16 per cent. on the average. That should not have been a very serious blow to foreign trade. You, like me, were probably under the impression that we had a tremendous increase in our tariff duties. We did not have any such thing. You may think that this is due to the fact that I have taken an average for a large number of commodities, and that may be true, but if you will look at the average tariff calculated in the same way upon dutiable commodities, you will find that the increase due to the 1930 tariff was from 33.2 per cent. to 40 per cent. That is some increase, but it does not sound as serious as it has been made to appear.

You will say again that perhaps there is some trick in averaging these duties, so let us split the thing up into two of the principal categories. We will take agricultural products and non-agricultural products. The duties on the agricultural products were raised from 38.1 per cent. on the average to 48.9 per cent. In the non-agricultural products the duties were raised from 31 to 34. It is perfectly clear that this great increase from an average of 33 to 40, if you call that great, was very largely due to the increase in duties on agricultural products.

There were things like sugar, wool, and its manufactures, and so on, and they are not these crops that you think of the farmer raising, but the businesses that he did that were protected by the 1930 tariff increase, and protected because everybody agreed that the farmer needed some help.

It was not the industry, it was not the chemical industry particularly, that was so greatly aided by this increase in the 1930 tariff.

What was the effect of this tariff on the actual imports? One of the difficulties in gauging the change in foreign trade is to find a unit by which to measure it. All of the commonly expressed figures are given in dollars. Those are the dollars of valuation at the time of the import or export. It is necessary to find some unit which will be a common denominator for all commodities and the dollar is the simplest one. But suppose the value of the dollar changes. Your yardstick is upset entirely. If the value or cost of commodities changes radically, then your value of exports and imports becomes no good because the change in the dollar value may be due to the change in the value of the dollar itself instead of to the change in the volume of the export and import business.

In order to avoid that difficulty the Department of Commerce prepares what it calls indexes. I am not enough of a statistician to explain to you exactly what an index is but it is an honest effort to express, or to give a measure of, the subject to which the index is applied.

Taking the years 1923 to 1925 as a 100, as normal,—during 1923 to 1925 you will remember they were very prosperous years—we had come out of the 1920 and 1921 depression and we did not get into the 1927 to 1929 boom years, but we were doing right smart business along 1923 and 1925—things were fairly good but they were not inflated. The index for the year 1931 prepared by the Government Department, using the 1923 to 1925 average as a basis for a 100, shows that the dollars value of the foreign business was 54 per cent., in 1931 it was 54 per cent. of 1923-1925. But the tonnage volume, the unit volume, the pounds and yards and gallons—there were a great variety of course—were 98 per cent. in 1931 of what they were in this period 1923-1925.

Does it look to you gentlemen as though our foreign business was ruined by the 1930 tariff? It certainly does not appear that way to me.

70% Foreign Goods Tariff Free

If you put up a tariff on everything, you are going to spoil international trade, especially if you put it high enough so that a foreigner cannot ship in. That is A B C. But who is talking about putting a duty on everything? At the present time only 30 per cent. of the imports into this country are dutiable. The other 70 per cent., in excess of two-thirds, come in free.

If someone abroad wants to pay a debt to us in commodities it certainly is an easy thing to find a commodity among two-thirds of the whole that is not dutiable. Why don't they ship us those? You know why. Those are not the things they want to get rid of. They want to get rid of the things that we do not want to have over here, and hence the goods we put the duty on. We are perfectly willing to accept the things that we want, and we will take them in exchange for the debts.

In order for any country to pay a debt to this country, the balance of trade must be affected. Our so-called economists tell us that we have become a creditor nation and that the balance of trade is in our favor in the sense that we are continually having surplus money that we must send out to somebody. On

the average our exports in dollar value exceed our imports, therefore, they say that the balance of trade is in our favor, and something has to be done to change the situation before European countries can pay their debts to us.

If you consider your personal income, and only consider your salary, you will find that the balance of trade in your household is *agin* you. If you forget the other sources of income outside your salary, you will come to the same error as our economists when they look at our exports and imports and conclude that the balance of trade is favorable to this country. It is very difficult in a nation to find those so-called invisible items of payment. They consist of such things as remittances abroad by American citizens, by check, bank draft, Postal Order, cash or in whatever way they are delivered. They include the payments that travelers make when they go abroad. Those are offset by the money that comes in here and by the expenditures of European travelers in our country. But those can all be estimated with a reasonable degree of accuracy. The Department of Commerce has calculated that although during the period from 1922 to 1931, that is ten years, the balance of export and import commodities, that is the usual figure, showed $600,000,000 per annum excess of exports. However, the invisible items showed $700,000,000 per annum payments by us to other countries. That more than offsets the balance of trade due to the merchandise and the net result was that we were paying out about $100,000,000 a year on the average. Take a single year, 1931, and realize that there were $570,000,000 spent abroad by American travelers, then you can understand where these things come in. Our export business was only five times that. That one item of travelers' expenditures abroad is enough to upset the whole international trade.

The Gold Standard

Now we come to the third point, namely, that we are ruining foreign exchange and drawing all the gold into the United States. When you get into foreign exchange and gold as value, and what it is used for, you are getting into finances pretty deep, but there are a few figures that prove there is nothing serious happening to exchange and gold that at least will have any effect on the chemical industry.

The fact is that in 1912 this country had 39 per cent. of the world's gold, and in October, 1932, it had 32 per cent. During the summer just past it got down as low as 30 per cent. That is, we actually have less share of the world's gold now than we had 20 years ago. How can anybody say that we are drawing all the gold to us?

Take again, since 1912 the holdings of gold in the United States have increased 100 per cent. You take all the other countries in the world and they have increased 170 per cent. because the supply of gold has been increasing and more and more is mined all the time. Great Britain, since it went off the gold standard, has increased her holdings 300 per cent. It does not look as though the finger of scorn should be pointed at the U. S. A. as the wicked one who has been drawing all the gold.

We have an awful lot of gold here and comparatively speaking we have very few people. We are not a populous country in proportion to our wealth. But the real usefulness of gold is the basis of credit, and to determine whether a country has too much or too little gold, you should relate gold to volume of credit. One of the best indexes of credit is the amount of bank deposits. This country has less gold per million dollars of bank deposits than almost any country that is civilized and has a banking system. We are at about the bottom of the list, conclusive evidence to me that we have not too much gold and that we are not treating the rest of the world unfairly in that respect.

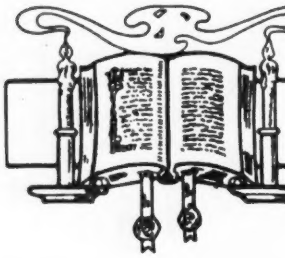
National vs. Individual Debts

I cannot see any difference between a national debt and an individual debt. If I say to you, "Lend me a hundred" and you answer, "Sure I will, but for how long?" and I say, "I will pay it back to you tomorrow." So you lend me the hundred and tomorrow goes by and you do not see me, you are pinched; but am I not in a worse position? I never can borrow again from you. Anybody that heard of that transaction will not lend me any money again. That is the international debt situation. Any government that borrows from another and does not pay it back will suffer a lot more than the fellow who is out the money. It may be a shock to us to have to make up for this balance, these billions of dollars owed to us, through taxes; but it seems to me that those foreign countries will be in a much worse predicament.

The whole thing is a question of whether they can pay us or not. They certainly ought to do their darndest for their own sake. Why they ask us to settle the question for them I do not understand. We ought to be willing to forgive the debts, if they are willing to accept the forgiveness, but that seems to me to be the rub. How will you get the debts forgiven without spoiling the credit of those debtors. If they spoil their credit, how can they ever compete in world business thereafter? If those debts are not paid it ought to be of benefit to the chemical industry in this country because there certainly will be less business done abroad and there will be less competition in this industry.

I am afraid I have skipped around among these subjects in a very irregular way. I would like to repeat what I said at the beginning. I want to put a few thoughts in your mind, backed up with reliable figures, in the hope that some of you will go out and do something that will be helpful to the chemical industry.

Chemical Chronology 1932



January

Henry Ford and William B. Bell, Cyanamid president, announce their companies no longer interested in Muscle shoals. ℂ Charles H. McDowell, Armour Fertilizer president, retires after 45 years of service. ℂ U. S. Circuit Court of Appeals for 5th District denies right of Dry Ice to enjoin Louisiana Dry Ice from the use of the words "dry" and "ice." ℂ Dr. Charles H. Herty receives 1932 American Institute of Chemists' medal. ℂ Prof. James Bryant Conant, Harvard, awarded William H. Nichols medal. ℂ P. Val Kolb elected president, Provident Chemical Works. ℂ Dr. J. G. Davidson, Carbide and Carbon, promoted to vice-presidency. ℂ Charles E. Fisher resigns as St. Louis Grasselli manager. ℂ Percy C. Magnus, heads drug and chemical section, N. Y. Board of Trade. ℂ Texas Potash reports plans for a refining unit. ℂ Magnesium Development formed by Aluminum Co. and I. G., to research magnesium uses. ℂ Committee on Unemployment and Relief for chemists and Chemical Engineers formed in the metropolitan area. ℂ Dr. C. F. Burgess receives Perkin medal and Dr. Carl Bosch the Nobel Chemistry Prize. ℂ Chilean government files answers to questionnaire from Senate Finance Committee.

February

Copper conference fails to agree on curtailment of production. ℂ Insecticide and Disinfectant Manufacturers' Association adopts fly-spray standards. ℂ West Coast Fertilizer League formed with John Stauffer, Jr., president. ℂ Charles P. Gulick elected president, National Oil Products. ℂ Du Pont's Cellophane plant increases production. ℂ Sheldon, Morse, Hutchins and Easton organize consulting firm on industrial marketing problems. ℂ Stock market turns bullish and nine leading industrial chemical common stocks appreciate $94,331,142. ℂ U. S. I. sets up a special contingency fund of $5,000,000 from surplus. ℂ Lowell Thomas addresses Salesmen's Association. ℂ Swann announces new highly concentrated (64% plant food) fertilizer.

March

Industrial Alcohol Bureau announces new methanol regulations. ℂ International Combustion Tar & Chemical sells plants to P. C. Reilly, president, Republic Creosoting. ℂ Zinsser & Co. sells alkali blue printing ink plant to Calco. ℂ J. E. Lockwood leaves Hercules after 12 years in the naval stores division. ℂ A. L. Loebenberg elected a vice-president by U. S. I. directors. ℂ Dr. Hugh Scott Taylor, Princeton, nominated fellow of the Royal Society of London. ℂ John F. Queeny, chairman, Monsanto, honored at dinner as tribute to his 60th anniversary in chemical industry. ℂ M. G. B. Whelpley, Cosach president, returns from Chile and plunges into the problem of company refinancing. ℂ Cyanamid reports profit of $520,803 for 18 months' period. ℂ Francis P. Garvan, Chemical Foundation head, bitterly attacks new dye cartel. ℂ Dr. Lewis H. Marks is feted by friends at the Chemists' Club (N. Y.) for his work in clubhouse renovation.

April

Relief Committee for Chemists and Chemical Engineers, Frank G. Breyer, chairman, seeks $15,000 in the metropolitan area for the period April 25th to July 1st. ℂ Assistant Secretary of the Treasury Lowman hears domestic sulfate of ammonia producers on alleged "dumping." ℂ Manufacturing Chemists' Association files objections with Committee of Agriculture and Forestry (Senate) to proposed "Bingham" Anti-Poison Bill. ℂ Du Pont issues statement on delay in bringing to trial Glidden test suit (lacquer-Flaherty patents). ℂ Corn Institute is dissolved on order of Judge C. E. Woodward, U. S. District Court, Chicago. ℂ Swann Corp. expands sales program and opens five new district offices. Cleveland-Cliffs starts production activated charcoal. ℂ Arnold E. Pitcher is president Du Pont Viscoloid, succeeding C. K. Davis new R. & H. president. ℂ Dr. M. C. Whitaker elected director and vice-president, Cyanamid. ℂ Dr. Mortimer J. Brown, director and vice-president of research of R. & H., resigns to enter private practice. ℂ Cosach finance conference in New York drags while interest on Anglo-Chilean Consolidated's 20 year 7 per cent. debentures, due May 1, goes unpaid. ℂ Solid Carbonic and Dry Ice amalgamated. ℂ Stock market suffers severe collapse with chemical stocks' average 20 points below the previous month.

May

Manufacturing Chemists' Association meeting at Absecon where Committee on Containers issues valuable new manual. ℂ Montero, Chilean president ousted by Davila who threatens confiscation of private property, including Cosach. ℂ House passes Hill Muscle Shoals Bill. ℂ At the instigation of Representative H. P. Fulmer, House request data from Treasury Department on alleged ammonium sulfate dumping. ℂ Dr. E. A. Rykenboer elected president of R. & H. of California. ℂ Edward L. Sayers, Swann vice-president, placed in general charge of sales in five southern states. ℂ George Cooper resigns sales managership, Diamond Alkali, to become vice-president H. B. Prior & Co. ℂ Edward M. de Greeff, head of the English company, visits New York offices. ℂ George C. Lewis re-elected president Chemists' Club (N. Y.) ℂ Francis P. Garvan awarded Mendal medal by Villanova College. ℂ Clarence Morgan (Chicago) forms new distributing company. ℂ U. S. chemical foreign trade continues balance in favor of exports over imports. ℂ Several chemical companies' common stocks go below 1921 deflation levels. ℂ Union Carbide reduces quarterly dividend from 50 to 30 cents.

June

National Fertilizer Association re-elects Bayless W. Haynes president and honors Charles H. McDowell with honorary membership. ℂ Cyanamid groups 12 subsidiary companies' activities under American Cyanamid & Chemical. ℂ Rumors of merger of Virginia-Carolina and Armour Fertilizer. ℂ Secretary of the Treasury refuses the House testimony on alleged sulfate of ammonia dumping. ℂ Judge N. McVicar (Western District of Pennsylvania) finds

for Selden (Cyanamid) in case brought by General alleging infringement of Slama-Wolf patents (vanadium catalysts in contact sulfuric acid manufacture). ℂ Du Pont's lacquer test case against Glidden tried in Brooklyn with decision reserved. ℂ Bureau of Industrial Alcohol modifies formula of C. D. 5. ℂ Dr. Lloyd F. Nickell, director of Monsanto's English branch, visits this country. ℂ American Solvents & Chemical reorganized. ℂ Dow reports net profit $2,070,884 for the year ending May 31st.

July

British Imperial Trade Conference opens at Ottawa and Capt. J. Davidson Pratt and Dr. C. F. Armstrong, English chemical industry representatives, are honored at several functions held in this country. ℂ Synthetic and natural nitrate producers reported in agreement after year of open warfare. ℂ Bureau of Standards issues commercial standard for sulfonated oils. ℂ Freeport Texas acquires new dome. ℂ Hydrogenation patents in U. S. passes to Hydro Patents Co. ℂ Michigan Alkali appoints Merchants Chemical Philadelphia distributor. ℂ American Gum Importers' Association launches research. ℂ Sicilian Sulfur Consortium dissolved and rumors of the suspension of Spanish-Italian mercury cartel. ℂ E. K. Bolton, Du Pont chemical director, awarded Doctor of Science by Bucknell. ℂ Chemical companies' common stocks rally smartly. ℂ Petroleum Distillation formed by several oil companies to overcome patent difficulties. ℂ Mathieson reports $171,929 profit for quarter. ℂ Freeport shows net income of $1,060,743 for six months ending June 30th, as against $1,185,092 for the same period in 1931.

August

Chemical Exposition exhibitors seek postponement 1933 Show. ℂ Secretary Mills issues order against "dumping" of sulfate from several European countries. ℂ Offer to barter American wheat for Chilean nitrate attacked by Garvan. ℂ Chilean nitrate is reduced $11 a ton. ℂ Dr. Charles L. Parsons, A. C. S. manager, awarded Priestley medal. ℂ U. S. chemical foreign trade balance improved in second quarter. ℂ American Hyalsol formed to acquire U. S. and Canadian patents on higher alcohols held by two German concerns. ℂ Standard Ultramarine and Monsanto drill for natural gas in West Virginia. ℂ Hercules centers research at new laboratory near Wilmington. ℂ Standard Oil conducts press representatives through Bayway, N. J. hydrogenation process plant. ℂ In sensational market chemical common stocks rise to new highs for 1932. ℂ Du Pont lowers common dividend rate from $3 to $2. ℂ Prior preference stockholders of Virginia-Carolina reject Armour merger. ℂ A. A. C. reports net loss of $1,224,056 for year ended June 30th.

September

Japan offers alkali, ammonium sulfate and superphosphate in U. S. at extremely low prices. ℂ Chemical Exposition postponed to December 1933. ℂ Chemical industry represented before House Committee investigating "government in business." ℂ Dr. Charles H. Herty reports progress in plan to utilize Southern pine in paper pulp manufacture. ℂ Davila, Chilean socialistic provisonal president goes the way of his predecessors and country is torn with internal dissension over Cosach. ℂ America's probable loss in chemical exports to Canada through Ottawa Pact estimated at $3,000,000. ℂ "Eddie" Orem, Du Pont, noses out "Al" Alvarez, Grasselli, for Salesmen's golf championship, and Frederick Kenny, New York City chief chemist, is victor in finals in Chemist's Club (N. Y.) tournament. ℂ Pfaudler Co. (glass lined equipment) 50th anniversary. ℂ Henry W. Peabody & Co. liquidate. ℂ Nitrite tariff brought to the Supreme Court by Norwegian Nitrogen Products. ℂ Dr. J. K. L. Snyder, formerly with J. T. Baker, joins Merck. ℂ Virginia-Carolina, Armour Fertilizer merger abandoned. ℂ Jacques Wolf & Co. adds new unit to Passaic plant. ℂ Pennsylvania Salt reports net of $2.42 a share for year ended June 30th. ℂ The Chlorine "war."

October

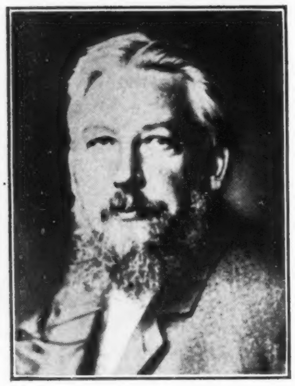
Commissioner of Customs, F. X. A. Ebie, hears dumping charges against European manganese, fertilizers, and oils. ℂ Prof. L. Clark, Illinois, presented with Grasselli medal. ℂ Goodrich's George Oenslager is the 1933 Perkin medalist. ℂ John A Chew resigns Swann vice-presidency to "go it alone." ℂ Chemical Foundation sues General Aniline, alleging infringement of two dye patents. ℂ A. A. C.'s president, Horace Bowker, suggests $100,000,000 loan to farmers to buy fertilizer. ℂ Alessandri, arch foe of Cosach, elected president of Chile. ℂ George A. Holderness succeeds Judge Wilson as president of Virginia-Carolina. ℂ Copper conference in New York. ℂ Mercury cartel is revived. ℂ Du Pont quarterly earnings of $5,531,096. ℂ Bitter fight in disodium phosphate market. ℂ Shipments in October are larger than in any previous month of 1932. ℂ Du Pont starts production of urea-ammonia for fertilizer.

November

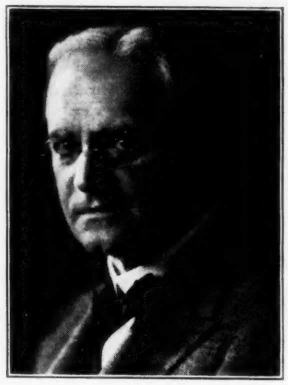
Cyanamid's Derby heads chemical division, (New York) Unemployment Relief Drive. ℂ Langmuir feted by Chemists' Club on departure for Sweden to receive Nobel Chemistry Prize. ℂ New company, International Latex Processes, formed by U. S. Rubber and Dunlop (England), to pool latex patents. ℂ Largest single mercury shipment arrives New York, for G. E. ℂ American Institute Chemical Engineers, Dr. John V. N. Dorr, presiding, celebrates silver anniversary. ℂ B. J. Gogarty, Rossville, new president, Salesmen's Association. ℂ Will of late William R. Peters, well-known chemical merchant of an earlier era, is filed for probate. ℂ Director Weidlein, Mellon Institute, disputes technological unemployment before University of Pennsylvania Alumni Association of Engineers. ℂ Monsanto goes "five day week." ℂ Efforts to revive Sulfur Consortium fail. ℂ Freeport Texas acquires still another dome. ℂ Dowell, Inc., formed by Dow to handle natural gas developments. ℂ Henry E. Treide replaces C. Wilbur Miller as Davison Chemical head. ℂ Standard Alcohol formed by petroleum interests to pool patents covering alcohol production. ℂ Glidden wins suit brought by Du Pont to test Flaherty lacquer patents. ℂ Wishnick-Tumpeer announces new group of quality black colors. ℂ International copper conference ends in disagreement. ℂ Davision announces Silica Gel plan effective, despite several suits by dissatisfied bondholders. ℂ Virginia-Carolina offers to buy $3,000,000 of own prior preference stock. ℂ Chemical stocks continue downward. ℂ Lower bichromate contract prices announced for 1933. ℂ "War" in disodium phosphate spreads to the tri-salt.

December

Calco (Cyanamid) acquires Noil Chemical & Color. ℂ Lammot Du Pont is honor guest at Saturday luncheon Chemists' Club (N. Y.) ℂ F. E. Layman, formerly with Bakelite, goes with Sherka Chemical. ℂ Circuit Court of Appeals reverses lower court and finds infringement by Corn Products of the Widmer patent owned by Penick and Ford. ℂ Dr. La Mer succeeds Landis as chairman, New York Section, A. C. S. ℂ Abbott Laboratories orders Christmas bonus for all employees. ℂ Diamond Alkali wartime profits tax goes to the Supreme Court. ℂ Armour Fertilizer main offices are moved to Atlanta, and Virginia-Carolina closes its New York offices. ℂ Strong faction in Chile oppose granting of further loans to Cosach. ℂ Commercial Solvents wins Weizmann patent suit against Union Solvents in District Circuit Court of Appeals. ℂ Cosach is dissolved by President Alessandri.



Wilhelm Ostwald



George Eastman

Chemical Necrology 1932

Arthur S. Somers, president, Fred L. Lavanburg Co., aged 66. January 6.

Dr. John Brown Herreshoff, first American Perkin Medalist, aged 81. January 30.

Gilbert A. Bragg, general manager, Koppers Research, aged 41. February 2.

George O. Elmore, president, Smith & Nichols, aged 51. February 8.

Dr. Samuel William Wiley, president, Wiley & Co., aged 63. February 23.

David Lyon Jacobson, chemical engineer, Koppers Research, aged 39. March 6.

George Eastman, founder and chairman of the board, Eastman Kodak, aged 78. March 14.

Ellis Jackson, founder and president, Ellis Jackson & Co., aged 71. March 28.

Wilhelm Ostwald, noted German chemist and Nobel Chemistry Prize winner, 1909, aged 78. April 2.

J. M. Rowland, chief engineer, Hooker Electrochemical. April 6

James McCobb Selden, founder and former president, Selden Co., aged 69. April 12.

Charles G. Prescott, general manager, Cincinnati branch, A. A. C., aged 64. May 2.

Lorenzo Benedict, president, Worcester Salt, aged 70. May 6.

Frederic M. Harrison, former U. S. I. president, aged 66. May 15.

David Oliphant Haynes, publisher of drug and chemical trade papers, aged 74. May 19.

Augustus Damon Ledoux, president Pyrites Co., well-known chemical engineer, aged 65. June 5.

Charles L. Riker, former officer in firm of J. L. & D. S. Ricker, aged 69. June 22.

Julius Henry Daniel Rodier, retired Grasselli vice-president, aged 70. June 25.

Sydney Thayer, Sr., secretary and treasurer, Bower Chemical, aged 64. July 9.

Dr. Louis Joseph Matos, former chief chemist, National Aniline, aged 69. July 9.

Philip Hayes, chief engineer, Solvay's plant, Tully, N. Y., aged 63. July 14.

William S. Robertson, president, Heller & Merz, aged 62. July 23.

John Jackson Riker, former president, J. L. & S. D. Riker, aged 74. August 4.

Albert Gardner Robinson, former U. S. I. treasurer and noted newspaper correspondent, aged 77. August 20.

I. Heckenblieckner, Chemical Construction Co., vice-president, aged 47. September 17.

Alfred W. Jenkins, senior partner, Parsons & Petit, aged 70. September 25.

Henry Somers Chatfield, vice-president, Mac-Lac-Kasebier-Chatfield, aged 68. October 27.

Franklin Murphy, Jr., chairman, executive committee, Murphy Varnish, aged 68. November 10.

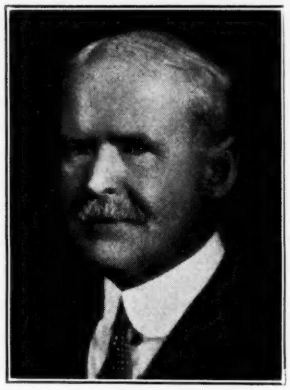
Francis E. Holliday, general representative, National Whosale Druggists' Association. November 19.

Albert E. Waller, vice-president, Ansbacher-Siegle Corp., aged 51. November 26.

Gustave Adolphe Paul, president, Adolph Hurst, aged 49. December 9.

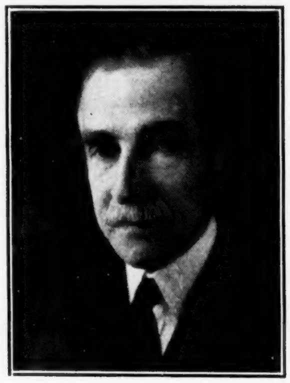
Samuel Gelston King, president, E. & F. King, Boston. December 21.

William J. Robertson



Sidney Thayer, Sr.

David Oliphant Haynes



Alfred W. Jenkins

David Lyon Jacobson

Henry Somers Chatfield

Julius Henry Daniel Rodier

Arthur S. Somers

Protection Against Decline

By Elvin H. Killheffer

LET us examine briefly the whole question of contracts in the chemical industry. We are taught that there are several essentials of a contract such as proper consideration and a "meeting of the minds" of the parties. On just what points do the minds meet in the usual contract in the chemical business?

First: John Doe agrees to sell and Richard Roe to buy.

Second: The parties agree as to what product is referred to.

Third: The parties agree as to quality of the product.

Fourth: The parties agree as to quantity.

Fifth: The parties agree as to price.

Sixth: The parties agree as to delivery, containers, etc.

Of these, I think we will agree that the third, fourth and fifth are the most important. On only the matter of quality is there perhaps a meeting of the minds of the parties. On the question of quantity, the quite usual practice is to make the contract read for buyer's requirements. What does it mean? The buyer claims he does not know and that for that reason he must leave the quantity indefinite. The seller would like to know, otherwise he has no idea of what obligation he is really assuming.

There is not even a pretense of any meeting of minds. The buyer is optimistic in his estimates as that will exert a favorable influence on the rest of the contract, but he is not willing to bind himself on those estimates. The seller if he really wants to perform his obligations must nevertheless pay some attention to the estimates, otherwise he may not have sufficient material on hand in order to make prompt shipment against the buyer's orders. This often results in over production and later distress selling which is against the best interests of both buyer and seller.

Now we come to price. Whatever the original agreement as to price, it is usually thrown wide open by the inclusion of the clause protecting the buyer against price decline. Perhaps the clause provides that the protection is only against the decline in the seller's own price. Sounds nice but in practice the sellers price follows the market so that in reality it is protection against any and all decline. Whether in the price of the article of a responsible competitor or that of distress lot in weak hands, this wonderful price protection device simply shifts all responsibility from the buyer to the seller.

No corresponding clause enables the seller to increase his price for some stated reasons. We are walking down a one way street. If there is no reciprocal provision for the increase of price then, in reality, the protection against decline is insurance which the seller writes for the buyers benefit. But in legitimate insurance enterprises, it is customary and also very necessary to charge a premium for the insurance which is to compensate the insurer for the risk taken. We look in vain for any premium in the case under discussion. Does anyone contend that it is sound business to provide this insurance free?

A good buyer does not need price protection unless his competitor has it. When both he and his competitor have price protection then he can feel pretty sure that his own cleverness will avail him nothing. If a buyer is clever he makes definite forward purchases when in his opinion conditions including price are right in view of what he sees or expects in the future. His judgment of the situation may decide him to buy heavily and for a long period or quite the reverse. The clever buyer then has an advantage over his less clever competitor.

This short discourse should also include just a further word as to this magic word "contract." It seems to me that in making price schedules there is only one sound reason for differentials in price, and that is the quantity purchased. When I say purchased I mean definitely purchased on a binding legal contract which obligates both buyer and seller for the specified quantity. The time during which delivery

is to be made is of less importance if the matters of quantity and price are definitely fixed.

If prices were based on quantity purchased, then the very large buyer would receive the legitimate advantage in price to which he is or should be entitled. Every buyer would receive a price proportionate to the quantity. Under the system now prevailing we have *spot* prices and contract prices. If I use the magic word contract, I get the contract price regardless of the amount of goods I buy, for I say I will contract to take my "requirements."

This is a terrible abuse today. The chiselling type of seller winks at an "estimated requirement" which in amount he knows very well the buyer will not take, but by writing this so called contract he can give the lower price. It seems to me that the buyer even more than the seller would want to see the end of such an unfair and altogether vicious and unsound practice.

Fortunate are those industries who do not have to contend with these iniquitous practices. Exactly when and by whom protection and estimated requirements were started is uncertain, but it must have been some over-anxious alleged salesman with chiselling proclivities. In my opinion these are fundamentally unsound practices.

Aluminum Sulfate in Zinc-Plating

The application of aluminum salts in large quantities in widely different industries, among which ceramics production, paper-making, sewage treatment, and textile dyeing may be quoted as prominent, perhaps renders the consumption for electroplating purposes at first sight insignificant. Yet the works concerned with zinc electrodeposition account for an appreciable amount of aluminum sulfate per annum, and some brief notes upon its function for this purpose may prove of interest.

The object of adding aluminum sulfate to zinc-plating solutions is to suppress the ionization of zinc salts, and in this manner to minimize the concentration of zinc ions in the neighborhood of the work being plated; at the same time keeping the total zinc content of the electrolyte as high as possible in order that a reserve supply shall be available to replace this element at the cathode as fast as deposited. In zinc-cyanide solutions this addition is unnecessary, because a double salt of zinc and alkali cyanide is produced in solution. These alkali zinc cyanides ionize mainly with the zinc in the electronegative complex—viz.:

$$Na_2\,Zn(CN)_4 = 2Na' + Zn(CN)_4''$$

and only to a very much smaller extent yield positive zinc ions by single salt dissociation. The high total zinc content and low zinc ion percentage is automatically provided in this type of solution, and many electroplaters favor its employment not only for this reason, but also on account of its very good throwing power, and the uniformity and refinement of structure of the deposit obtainable. But even in these solutions, aluminum sulfate is included for its beneficial effects on color and smoothness.

Disadvantages inherent in many cyanide solutions, including the closeness of control necessary for maintenance of correct solution composition, the tendency to dark-colored deposits, and the extreme difficulty in freeing the plated coating from included cyanide by simple washing operations, have led to the wide adoption of other types of electrolyte, notably simple zinc-sulfate solutions, and this method has been rendered practicable by the availability of supplies of aluminum sulfate in a suitable condition of purity and solubility.

Zinc-sulfate solutions, despite additions of dextrine, glucose, and similar organic colloids, fail to yield other than coarse open-grained deposits, and also suffer from the serious drawback of very indifferent throwing power. Aluminum sulfate corrects these deficiencies to a considerable degree, and when present in appropriate amounts it ensures a structureless coating equal in this respect to any deposited from cyanide baths. Further, it asserts an astonishing influence on the color of the plated zinc, which acquires a pleasing whiteness, and which, furthermore, retains its cleanliness, being quite devoid of the spotting-out and darkening troubles that are so troublesome with cyanide platings. Again, plating rates can be attained that are difficult to approach with cyanide electrolytes, unless these latter are employed warm. Thus, with rotary cathode equipment, twenty to thirty minutes' plating time, according to the configuration of the article, is ample for deposits of 0.001 in. thickness. Zinc-cyanide compositions usually need to be operated at about 40° C. to approach this speed of working, and needless to say, the avoidance of cyanide decomposition products is a strong argument in favor of zinc-sulfate vats.

Table No. 1
Typical Analyses of Commercial Aluminum Sulfate Obtained from Different Sources

	Theoretical	*Sample No. 1*	*Sample No. 2*	*Sample No. 3*
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*
Aluminum content expressed as Al_2O_3....	15.4	17.8	16.6	15.3
Sulfate content expressed as SO_3......	36.0	38.2	41.5	36.0
Water...............	48.6	44.0*	41.9*	48.7*
Iron Impurity........	....	0.005	0.002	0.007
Color................	....	Dead-white	Slight brownish tinge	White

*By difference.

Aluminum sulfate corresponds to the formula $Al_2(SO_4)_3 \cdot 18H_2O$, which material is usually procurable in a state of fine division, which at first sight is almost an amorphous powder in appearance. It is this fully hydrated material, in as pure a state as possible, that is preferred for electroplating needs, since it is readily soluble. Actually, however, this fully hydrated neutral sulfate is not always available, and analysis of bulk deliveries from time to time reveals appreciable variations in the direction of both basicity and acidity. Since complete dissolution in weakly acid-plating solutions (maximum acidity being in the neighborhood of $pH = 3$) is essential, the extent of solubility of basic aluminum sulfates should be tested, and no more than a faint opalescence in water should be tolerated. Apart from ensuring absence of insoluble constituents, including dirt, it is important to determine the absence of iron, as some varieties of aluminum sulfate may contain notable amounts. Table No. 1 shows analyses of commercially pure aluminum sulfates representative of different consignments, and it is to be observed that sample No. 1 is definitely a basic modification, and No. 2 an acid variety. The very low iron content also is noteworthy.

Table No. 2
Some Typical Zinc Plating Solutions Containing Aluminum Sulfate

	Composition. Ozs. per Gallon.		
	No. 1	*No. 2*	*No. 3*
Zinc sulfate crystals.........	50	60	64
Aluminum sulfate...........	4	2	6
Sodium chloride	2	2	3
Boric acid..................	3	..	..
Dextrine....................	2	..	..
Glucose syrup...............	..	1½	2

Note.—Acidities adjusted by means of zinc carbonate or sulfuric acid.

As indicating the small quantity of aluminum sulfate necessary for satisfactory performance of zinc-sulfate electrolytes, three typical compositions that are employed are shown in Table 2. Periodic additions are made as indicated by analytical control.—*The Chemical Trade Journal.*

"Bread Out of Our Mouths"

A Study of Government Competition

By Paul Mahler, Ch. E.

Here is a Chemical Consultant with the courage to speak out frankly on matters concerning the competition with Uncle Sam's bureaucrats.

GOVERNMENTAL competition with the professional man engaged in chemical work is receiving today considerable attention. The cry being raised louder and louder, "Why should Government, which is being supported by the taxes of the nation, engage in businesses which are the means of livelihood for any group of citizens?" It is pretty well agreed that such governmental enterprises are basically unsound. Changes are demanded, and some people even condemn the whole structure.

Although such views are unreasonable, they are a natural sequence when an enterprise, which might have been started for public benefit, is allowed to develop without maintaining a careful, well balanced, flexible viewpoint. This viewpoint must take into account unavoidable changes in conditions, or the baneful reactions which are encountered today cannot be forestalled. So let us see if we can determine why this incongruous situation of Government competition with its taxpayers has arisen.

Prior to the creation of the Bureau of Standards the sole aid which Government could offer the domestic chemical industry against foreign competition was a tariff, which protection was far easier and less expensive to obtain than for the manufacturers to develop a more efficient technique. Ample reasons were propounded for justifying this demand, such as increased revenues, protection of vested capital, independence of foreign sources of supply, etc. The lobbyist's fee and "incidental" expenses constituted the sole outlay, but the obvious thing which should have been done, namely the improvement of the process technique, was overlooked. Only when some other party, seeing possible profits in the same industry, became a competitor, did the old manufacturer seek knowledge. But where was this knowledge to be obtained, and who could furnish it at the lowest cost? At the beginning of the twentieth century the technical schools in the United States were slowly approaching the more advanced standards of foreign institutions. The labors of the pioneers who, several decades before, had received their training in foreign lands and on their return modelled our technical courses along European ones, were beginning to bear fruit. Chemists became available who could improve old "secret" processes, and some of these men were being absorbed by the chemical industry. But this move entailed new expense.

With the creation of the Bureau of Standards in 1901, a staff of 14 men maintained at national expense was engaged for "the development, construction, custody and maintenance of reference and working standards, and their inter-comparison, improvement and application in science, engineering, industry and commerce." It must have occurred to some thriftily minded industrialist that inasmuch as these men would probably have plenty of spare time, certain problems which would benefit all members of an industry could be handled more economically by the Government than by an individual member. This reasoning seemed sound but the so-called lower cost was fictitious, for the cost of equipment, buildings, and other items which enter into commercial cost calculations had to be met. This support came out of the pockets of the nation's taxpayers. As the practice grew more men had to be engaged, more buildings and equipment were needed, so that in 1928 the modest structure which began with 14 men now covered an area of 43 acres, and employed 850 men of whom two-thirds were technically trained.

At the beginning of the century the chemical consultant also came into existence. The rapid growth of the chemical industry induced a greater

interest in chemistry and allied subjects, and more chemically trained men became available. Some of the older men either because of a pioneering instinct or lack of other work, started their own little professional business; a laboratory, an office, a shingle, and the chemical consultant had appeared on the zone of action. The income derived from this work was not large, for aside from the natural resistance to the newcomer, there was always the possibility of obtaining governmental cooperation at practically no cost. The professional man could not oppose such tactics, even if he had been inclined to do so, for to have fought back required power or money, or the concerted efforts of a group, none of which was available.

There was, however, one disadvantage in having Government do this type of work, one of the provisions being that the information would have to become public knowledge. But by using governmental aid no one manufacturer could gain more information than another. Only through the channels of private help could this be accomplished, and so some chemist or consultant was engaged. In this manner the revenue to the chemical profession grew a little; but always when new problems came up, and there seemed to be no end to them, and the accompanying expense always appeared to become greater and greater, the temptation arose to seek government help.

Spending the Taxpayers' Money

This gradual expansion of Government activities also opened a new avenue of barter. Votes could be gained by promising a group, such as the farmer, that the Government would undertake studies of the soil, water, fertilizer, or lend its aid in developing uses for waste products. In this way, the Bureau of Standards and its affiliated departments became in the hands of some vote-seekers a sort of political football. Now while there might have been some justification for recommending studies such as methods for exterminating boll weevil, locusts, malaria breeding mosquitoes, or even the study of some fertilizer problems, once these ventures had been started the process of expansion could not be stopped. Some of the evils resulting from this practice can be illustrated by these examples. Smelting plants, which had been discharging sulfur dioxide fumes over the countryside killing vegetation and incidentally human beings, suddenly found themselves faced with injunctions,—suddenly, only because no attention had been paid to this real danger. Was it the function of Government, or the taxpayer, to pay for the solution of this problem, effected through the medium of the Cottrell process? The same held true of dust explosions in flour mills and coal mines. No one seemed to question the advisability of spending the taxpayers' money for solving problems inherent to these and other industries, so it was done, and thus new departments were created, new staffs of men were engaged and the yearly expense grew and grew.

Now what was happening at Washington? To obtain a proper understanding of the forces at work in these quarters, one must consider the following factors: Government jobs are after all fairly secure and not extremely hard. Working conditions are generally far more agreeable than those encountered in commercial work. Pension benefits assure future protection. While it is true that the chance of earning large sums of money was not very great, this was offset by the other advantages.

Furthermore, with the rapid expansion of this institution, there was afforded a better opportunity that an assistant to a director might obtain an assistant for himself, acquire a new title, a little more authority, a little more money, all of which tended to satisfy human pride. Such a cycle when once started is difficult to stop. It is human nature, so we are told. However, such advancements could be achieved only by obtaining larger appropriations, but to justify them, it became necessary to show that problems benefitting the nation should be investigated. Hence manufacturers were induced to undertake this and that study pertaining to their industries, and to make it appear more fair, they were asked to defray part of the expense in the form of a fellowship. It did not require arguments that this procedure would be much cheaper than engaging the services of a chemist or a consultant, but the reasons for the lower cost were never mentioned. And so, finally, we arrive at the present day picture, just prior to the advent of the depression age, 1929 to the indeterminate future.

What voice had been raised against this practice prior to 1929? Did the consultant, who by this time was solidly entrenched, worry? Not in the least. Everybody was making a good living and the future was allowed to take care of itself. Indeed there were times when the consultant also demanded governmental cooperation, but all these practices were violating the soundest business principle: that you cannot get anything for nothing. The proof of this, is the situation of today.

Suddenly the lethargic professional man and also some chemical manufacturers came to the realization that Government is in business. That hurts. As long as everybody was making financial progress, there was no complaint, but when this became increasingly difficult, manufacturers of paints, textile goods and other commodities, as well as the chemical professional man, began to rise in arms and the cry went up that it is ridiculous for Government to compete with the private citizen whose taxes support the national structure.

But these results are simply the penalty of shortsightedness on the part of all the people engaged in the chemical industry and of those individuals who instead of inhibiting, encouraged the expansion of

the various Government bureaus. But even if we ameliorate the present situation, the same thing will happen again unless all of us continue to keep a careful watch. This can be illustrated by the following example taken from the Brass World, October 1932, pp. 216:

During the past several years the United Bureau of Standards, Washington, D. C., has conducted researches on electroplating, and has published numerous papers on copper, nickel, chromium and zinc plating. In order to expedite this work the American Electro-Platers' Society has, for the past four years maintained a research associate at the Bureau. This cooperation has resulted in publication on spotting out, and on throwing power and porosity in chromium deposition. . . .

The program for the next few years includes an extensive study of the protective value of electroplated coatings, and of methods of testing and specifying such coatings. At present about 7000 samples of steel are being plated at the Bureau with nickel, copper, chromium, zinc or cadmium, or a combination of these metals. Samples will be exposed at Sandy Hook, New York City, Pennsylvania State College, Pittsburgh, Washington, D. C., and Key West, and inspected at regular intervals. Other samples will be subjected to laboratory tests to determine their relation to exposure tests. When the work on steel is completed, other base metals will be included.

The total cost of this research will be about $10,000 per year for three years. Of this sum the Bureau is contributing about $4000 in service and equipment. The American Society for Testing Materials is spending about $1000 for racks and supports; and manufacturers have contributed about $1000 worth of metals and chemicals. The American Electro-Platers' Society must raise at least $4000 per year for the salary and traveling expenses of its research associate. Branches of the society have subscribed to the fund, and it is hoped that manufacturers interested in plating will supply the balance needed to complete this important investigation.

On what grounds can we justify the request that the Government be asked to do this work? Are there no competent metallurgists in the country who can handle this problem as well, if not better than the Government Bureau?

Who is to Blame?

In this age of technical advancement the need of Government help which may lead to competition, (and in the same category falls University competition under the school's name), is unwarranted. If the manufacturer cannot see the evil of encouraging Governmental cooperation for solving his industry's problems, if the resultant saving blurs his vision to the much greater future loss, there can only be one result: the Government will soon control all business, and Socialism or Communism, will be on us. On the other hand, if Government departments allow their legitimate activities to encroach on commercial fields, the resentment which is being felt today will arise again. Economies will be demanded and unavoidable injustices will result. But the blame for these injustices must be borne by those who blinded themselves to the obvious.

The solution of the present problem and the method which should be pursued in the future is not easy. Too many human elements enter into consideration and they will often becloud the real issues. We will have to find men, who in the absence of any fixed set of rules, must possess that rare combination of mental traits which is found in an unbiased, sound, flexible mind.

Gallium, Metal of The Future

By Gerhard Wagner, M. M. E.

At one time it was potash which made Stassfurt-Leopoldshall world-famous. Today the potash mines lie dormant, and efforts have been made to find new, rare minerals available for technology so as to build up a new industry. As a result of research by chemists of the Vereinigte Chemische Fabriken zu Leopoldshall the metals Gallium and Rhenium can now be so cheaply produced as to make them available commercially.

Gallium, that bright silvery metal, has been known since 1875, but its isolation was very expensive, since it occurs only in infinitesimal quantities, namely about 0.001% in zinc blend and other earths. Since German chemists have succeeded in isolating gallium as a by-product, it has become possible to reduce the price in the United States to $3.60 per gram, whereas only a few years ago the price was over $200.00 per gram.

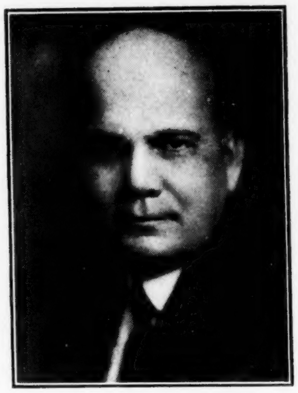
Its value of industrial application is not yet fully recognized. However, it is already known that this metal fills a niche in industry and has made new inventions possible. The remarkable properties of gallium are: its very low melting point, since the metal melts when held in the hand, and its extremely high boiling point of approximately 2,000° C. Furthermore, it is not tarnished nor corroded by exposure to air, which cannot be said for many metals.

How is gallium utilized? At the moment, in thermometers, in dentistry, in atomic and astrophysics, and particularly in radio and electro technology. In view of its high melting point, gallium thermometers can be made for temperatures of 500° to 1,000° C, whereas mercury thermometers, as is well known, can only be used up to 300° C. As distinguished from mercury, it is non-poisonous and is, therefore, to be preferred as an ingredient in tooth fillings. According to the discoveries of Prof. Dr. Stock in Carlsruhe concerning the effect of mercury poisoning upon human organisms, one German university clinic has for some time utilized fillings containing gallium with the greatest success.

It is also being used for optical mirrors, since it appears that the light absorption losses are thereby reduced. The atomic and astrophysical researches made heretofore in spectro analysis which were hindered by insufficiencies of the mercury quartz lamps can now be clarified by the use of gallium lamps. On account of the favorable electrical qualities of this metal attempts are being made to produce lighting tubes (Leuchtroehren) and photoelectric cells with the use of the new metal. Furthermore, it would appear that gallium may be of value in infra red transmission—as well as for the construction of lamps and photoelectric cells for mirrors. Reference should also be made to a French discovery in which it is used as cathode material for electron tubes. A filament of gallium or its alloys emits electrons at lower temperatures than is the case with ordinary filaments. Electron tubes of that type, therefore, require much less current for heating and are especially adapted for portable receivers. Attempts are being made to substitute gallium for mercury in rectifiers since in the case of gallium its high boiling point will permit operation at much higher capacity. There is also a possibility that with its low melting point it will also find application for fire alarms, signals and other similar applications.

The applications above indicated are not at all exhausted since mention was made only of those technical ones in which earnest development work is being done. They may, however, be regarded as examples in indicating the important applications of gallium which may be expected.

Patent Rights of Government Employees



By Lawrence W. Wallace
Secretary, American Engineering Council

TO INVENTORS the Government of the United States extends its protecting arm by offering to grant them monopolies for a limited period of years, in exchange for their disclosure of inventions and discoveries found to be truly new and useful. No differentiation is made between the unattached individuals, those in general employment, and those employed by the Government.

The inventor in general employment is usually considered to have a more definite patent status than his colleague in the employ of the Government. This is largely due to the greater number of court decisions relative to patents held by men in private employ, and because there has come to be a fairly definite relationship between such inventors and their employers. Contracts intended to clarify this relationship have contributed to this understanding and where such contracts do not exist the courts have held that the employer is entitled to no more than a shop-right where the inventor has perfected a discovery not in line with his regularly assigned duty, even though his work upon this invention was done on his employer's time and with his employer's facilities.

The act of June 25, 1910 (36 Statutes 851) reads as follows:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, that whenever an invention described in and covered by a patent of the United States shall hereafter be used by the United States without license of the owner thereof or lawful right of the owner to use the same such owners may recover reasonable compensation for such use by suit in the Court of Claims; provided, however, that said Court of Claims shall not entertain a suit or reward compensation under the provisions of this act where the claim for compensation is based on the use by the United States of any article heretofore owned, leased, used by, or in the possession of the United States; Provided further, that in any such suit the United States may avail itself of any and all defenses, general or special, which might be pleaded by a defendant in an action for infringement as set forth in Title 60 of the Revised Statutes, or otherwise; and provided further, that the benefits of this act shall not inure to any patentee who when he makes such claim is in the employment or service of the United States; or the assignee of any such employee; nor shall this act apply to any device discovered or invented by any such employee during the time of his employment or service.

This act was amended by the Act of July 1, 1918 (40 Statutes 705):

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, that whenever an invention described in or covered by a patent of the United States shall hereafter be used *or manufactured* by *or for* the United States without license of the owner thereof or lawful right to use *or manufacture* the same, *such owners remedy shall be by suit against the United States in the Court of Claims for the recovery of his reasonable and entire compensation for such use and manufacture;* (this is held to preclude recovery from Government contractors) provided, however, that said court of Claims shall not entertain a suit or *award* compensation under the provisions of this act where the claim for compensation is based on the use *or manufacture* by *or for* the United States of any article heretofore owned, leased, used by, or in the possession of the United States; Provided further, that in any such suit the United States may avail itself of any or all defenses, general or special, that might be pleaded by a defendant in an action for infringement as set forth in Title 60 in the Revised Statutes or otherwise; and provided further, that the benefit of this act shall not inure to any patentee who when he makes such claim, is in the employment or service of the United States; or the assignee of any such patentee; nor shall this act apply to any device discovered or invented by such employee during his employment or service.

The act of March 3, 1883, insofar as it related to the issue of patents without the payment of any fee was amended by the act of April 30, 1928, (45 Statutes 467), the new statute being as follows:

The Commissioner of Patents is authorized to grant, subject to existing law, to any officer, enlisted man, or employee of the Government, except officers or employees of the Patent Office (they are prohibited by statute from taking out patents on inventions), a patent for any of the classes mentioned in Section 4886 of the Revised Statutes, without the payment of any fee, when the head of the department or independent bureau certifies such invention is used or liable to be used in the public interest. Provided, that the applicant in his application shall state that the invention described therein, if patented, may be manufactured and used by or for the Government for governmental purposes without the payment to him of any royalty thereon, which stipulation shall be included in the patent.

Revised Statutes 4886—Any person who has invented or discovered any new and useful art, machine, manufacture, or composition of matter, or any new and useful improvement thereof, not known or used by others in this country, and not patented or described in any printed publication in this or any foreign country, before his invention or discovery thereof, and not in public use or on sale for more than two years prior to his application, unless the same is proved to have been abandoned, may, upon payment of the fees required by law, and other due proceedings had, obtain a patent therefore.

The more important cases tried which involved patent rights of government employees are here briefly reviewed. The case of Solomons v. United States (137 US 342) decided in 1890 was among the first which dealt with such patent rights. In this case the Government was desirous of having a new form of self-cancelling internal revenue stamp. One Clark, chief of the Bureau of Printing and Engraving, was assigned the duty of devising a stamp, which he did, the facilities and expenditures necessary for such development being furnished by the Government. A year after the stamp was adopted a patent was issued to the plaintiff as assignee of Clark, the former suing for compensation for use of the stamp in the Court of Claims. After a decision in favor of the Government, the plaintiff appealed. The Court ruled: "The Government has no more right to take a man's property invested in a patent than . . . . in his real estate; nor does the mere fact that an inventor is at the time of his invention in the employ of the Government transfer to it any title to, or interest in it. An employee, performing all the duties assigned to him in his department of service, may exercise his inventive facilities in any direction he chooses, with the assurance that whatever invention he may thus conceive and perfect is his *individual* property."

This is the general rule laid down by the Court subject to these two exceptions:

1. "But if one is employed to devise or perfect an instrument, or a means of accomplishing a prescribed result . . . . that which he has been employed and paid to accomplish becomes, when accomplished, the property of his employer."

2. "When a person in the employ of another in a certain line of work devises an improved method or instrument for doing that work, and uses the property of his employer and the services of other employees to develop and put into practical form his invention, a jury or a court trying the facts, is warranted in finding that he has so far recognized the obligations flowing from his employment and the benefits resulting from the use of the property, and the assistance of the co-employees of his employer, as to have given such employer an irrevocable right to use such license." This decision follows the rule of McClurg v. Kingsland (1 Howard 202) which did not involve the rights of the Government but those of a private employer.

McAlteer v. U. S. (150 US 424) was another early case involving the Bureau of Printing and Engraving. The Plaintiff was employed as a mechanic. In 1875 letters patent were granted to him for an improvement in paper-perforating machines. The cost of obtaining the patent was borne by the Government and the machines were put into actual operation at its expense. The Plaintiff, at the suggestion of his Chief, had executed an assignment to the Government giving it a license to make and use the machines, the assignment being in writing and expressing a valuable consideration. A contemporary agreement that the assignment was to be effective only so long as the Plaintiff was employed by the Bureau was made. At a later date the Plaintiff was discharged without his fault, and the suit was brought to recover compensation for the use of the machines after the time of his unemployment. The Court followed the ruling of an earlier case to the effect that: "If a person employed in the manufactory of another, while receiving wages, makes experiments at the expense and in the manufactory of his employer; has his wages increased in consequence of the useful result of his experiments; makes the article invented and permits his employer to use it, no compensation being paid or demanded; and then obtains a patent, these facts will justify the presumption of a license to use the invention."

This rule is the same as the second exception in the Solomons Case. However, in the McAlteer case the Court decided on the other ground involved. That a valid contract existed giving the Government a license to use the machines, and this could not be altered by a parol agreement with inconsistent terms.

Counter to Current

The case of Moore v. U. S. (249 US 487), decided in 1919, seems to be a cog in the wheel that does not fit. The Plaintiff in this case spent several years working on a reefing iron which was to be used in calking vessels. He became an employee at a Government ship yard and during the period of his employment he invented the tool. After leaving the service of the Government he brought suit for compensation for the use of his invention. The Court held; that, "The Act of June 25, 1910, allowing compensation from the United States for the use of patented inventions, provides that it shall not apply to any device discovered or invented by a Government employee 'during the time of his employment or service.' "

This interpretation of the Act of 1910 would seem to modify the general rule of the Solomons Case to make it read: "An employee, performing all the duties assigned to him in his department of service, may exercise his inventive facilities in any direction he chooses" . . . . if he should conceive and perfect any invention the title thereto would be his and the Government would have a license to use the invention. However, it must be recognized that the decision in Moore v. U. S. embraces only the laws under

which the recovery was sought. The Plaintiff brought his suit in the Court of Claims under the Act of 1910. Prior to the Act he could not have sued the U. S., hence, his rights in the present action are no greater than the Act specifies. If he is unable to recover compensation for the unauthorized use of his invention by the United States, it is only because the jurisdiction of the Court is limited by the Statute. In the case of Van Meter v. U. S. (47 Federal reporter, 2nd series, 192) a special Act of Congress conferred jurisdiction on the District Court to adjudicate the claim of a patentee in the service of the Government, against the U. S. for infringement of a patent, relating to parachute apparatus, because he could not bring suit in the Court of Claims.

The Moore case seems to conflict with an early case—U. S. v. Burns (12 Wallace 246), decided in 1870. In that case one Silby, an officer in the War Department had invented a tent which was approved by the Department for its use. A contract under the terms of which Silby was to receive five dollars for each tent manufactured by the Army was entered into. Burns received from Silby one-half interest in his rights and sued the Government for his contract-share. It was held that he could recover, that Silby owned the invention and the Government had no right therein, and that Burns had a legal basis on which to recover his one-half interest under the contract.

A Public Health Case

United States v. Houghton (20 Federal Reporter, 2nd series, 434) decided in 1927, was a suit by the United States to enjoin the Defendant and have the title to certain patents transferred to the Government. Houghton was a chemist in the Public Health Service and was assigned to work out a safe fumigant for use in vessels, etc. He succeeded after some effort in finding a suitable combination, the work being done at the expense of the Government and with the help of co-employees. The defendant took out a patent for the fumigant, giving the Government a non-exclusive license. He was subsequently assigned to find a liquid solvent which he promised to do, but he claimed that this was accomplished while he was on leave. The Court ruled: that, "An employee who undertakes upon the direction of his employer to solve a specific problem within the scope of his general employment, is as truly employed and paid for the particular project as if it had been described at the outset in the contract of employment. That which Houghton discovered belongs to the United States." This ruling is an interpretation of the first exception to the general rule as given in the Solomons Case. As to the liquid solvent the law is that of Gill v. U. S.—the Government has a license to use the product of his invention since he was under an obligation to it, and he cannot evade the obligation by developing the invention while on leave. The use of Government facilities gave it a license.

The United States v. Dubilier Condenser Corporation, decided in 1932, (59 Federal Reporter, 2nd series, 381) was another case in which the Government sued for the title to an invention. In this case Lowell and Dunmore were employed in research at the Bureau of Standards and did experimental work in the radio division. They conceived several ideas and developed them into patents. Their rights were then transferred to the defendant corporation. The Court held that the Government had a shop-right or license to use the inventions but ruled that the title belonged to the Defendant. Although the inventions involved the same matter as the general field of employment, there had been no specific assignment of these two men to such work. Superior officers merely gave encouragement after the discoveries were made.

Patent by Army Officer

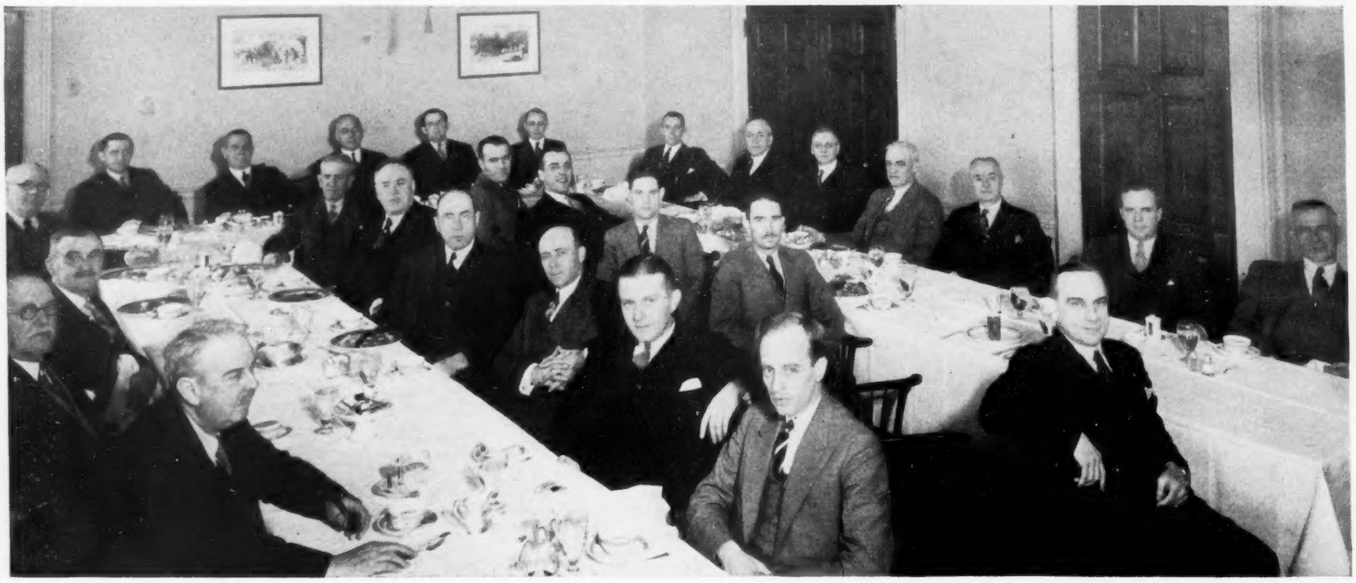
Squire v. American Tel. and Tel. (7 Federal, 2nd, 831) which was decided in 1925, involved the Act of March 3, 1883. An Army officer perfected a device while using public money and obtained a patent under the Act without the payment of a fee. In his application he swore that any person in the United States might use such invention without paying anything therefore (the amended Act only requires that the Government be given this right), approved a statement of his superior officer to the same effect, communicated similar declarations to the press, and addressed a technical association in a like manner. The Court held that he intended to so dedicate the invention, and that on subsequent discovery of its value he could not claim that he had been misinformed and acted on a mistake of law. The Court also stated that had he taken out the patent at his own expense, his use of Government facilities would have given the Government a license to use the invention under the decision in Gill v. U. S.

The foregoing cases seem to establish that the Government has a non-exclusive license in every patent taken out by a person while in the employ of the Government, inasmuch as the right to sue for compensation in the Court of Claims is denied to the patentee by the Act of 1918. That wherever there is a specific assignment to a particular problem, either at the start of employment or a later time, the title to any patent that might arise therefrom belongs to the Government. Where there is not specific assignment to the problem, the title to any patent taken out by a Government employee is in such employee. If it is not clearly established that the Government has a license in every patent taken out by a Government employee, it has, nevertheless a license where the invention is developed at Government expense with the help of Government facilities.

CHEMICAL

The Photographic Record

The Philadelphia Chemical Club, one of the oldest local organizations of chemical men in the country, elected new officers and listened to an address from their only honorary member at the Downtown Club, December 12th. At the head of the table, left to right, are Colonel Thomas F. Meehan (Jas. Good, Inc.), ex-treasurer now vice-president; Williams Haynes (Chemical Markets) the speaker; John N. Hand (Grasselli) retiring president; George B. Heckle, Jr. popular, perennial secretary; and J. M. Rosenberger (Smith, Kline and French) president-elect.



Jacob Stein Studio

In this corner of this big room is the administrative dynamo of the American Cyanamid—desk of its president, Harry L. Derby. Mr. Derby's office is, above all else, comfortable—cream walls, rust-colored rug, olive green hangings, a collection of generous black leather overstuffed chairs, and sofa. Extremely significant details are the pair of telephones, the radio, and the globe. Obviously, this executive believes in keeping in quick communication with many affairs.

The restful, library-like office of Theodore Swann at the right at headquarters in Birmingham belies the nervous energy of the man who works here. Over the beautiful fireplace is an alchemical painting, and except for the desk and office chair, the furniture is antique and the rugs are oriental. Like Mr. Derby, Mr. Swann uses a brace of telephones, and the great council table in front of his desk is a symbolic piece of furniture.

NEWS REEL

of Our Chemical Activities

Quiet dignity and a staid, business-like atmosphere pervades the brown and mahogany office of Roessler and Hasslacher's new chief executive, C. K. Davis. His workroom is large, with cream walls and natural colored hand woven linen curtains and a restful taupe rug —the whole a combination of solid comfort and straight business.

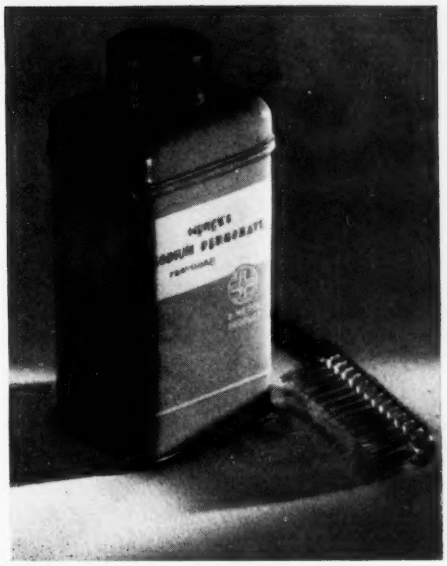
"Meet the new P.A."—Ralph B. McKinney, recently promoted to Director of Purchases for the Hercules Powder Company, headquarters in Wilmington.

Jacob Stein Studio

As befits the headquarters of the oldest New England chemical manufacturing company, whose president was a graduate of Annapolis—Mr. Belknap's office at Merrimac is finished in pine panels and hand made pine furniture, suggestive of the Colonial Inn, and the decorations are distinctly nautical. Behind his desk is an elaborate barometer, he faces a fireplace over which hangs a portrait of a naval officer ancestor in uniform. Above is what is familiarly known as the "sanctum sanctorum," with natural finish mahogany panels and bookcases, and old industrial prints on the walls—the holy of holies of Chemical Markets.

Which Synthetic Resin?

By John P. Dunne
Works Engineer, Durium Products (Gt. Brit.) Ltd.



Photos courtesy General Plastics, Inc.

SINCE 1907 when Dr. Baekeland first published the results of his research in the field of plastic molding, the production of synthetic resins has grown spectacularly. One enthusiast predicts that the production of synthetic plastics will surpass the production of steel within fifty years. While this may be but a dream, the amount of research being carried on augurs well for the future.

Originally, the purpose underlying the development of synthetic resins was their substitution in varnishes for the natural resins, such as copal and kauri gum, whose lack of uniformity and increasing cost caused many a headache to the varnish maker. Since that time, the synthetics have come to use not only in varnishes and lacquers, but also in hundreds of other articles ranging from buttons and poker chips to automobile and airplane parts, furniture, waterproofing and insulating materials. Relatively few industries in America could not use synthetic plastics in the preparation or improvement of their products.

There are many types of resins, the best known of which are the phenol-formaldehyde, urea, coumarone and glycerol-phthalate resins. Each of these types seems to have its own particular uses in which it excels all others to a marked degree, although in many products several types may be used to advantage. The problem confronting the potential user of synthetic resins is therefore twofold:

(1) The selection of the proper type of resin for his product.

(2) The development of a formula to give maximum results in service at minimum expense.

To answer the problems satisfactorily requires not only wide knowledge of the properties of the different types of resins and their modifications, but in nearly all cases also some research to fit the individual problem.

The first steps in the formulation of a synthetic resin for a definite purpose are:

(1) A review of the uses to which resins of all types have been put successfully.

(2) A study of the physical and chemical properties of the finished article from the resins selected.

(3) A study of the cost of production, public demand and market price of the finished article. We can review briefly some uses of each type of resin with some of its advantages and disadvantages.

Phenol-formaldehyde resins are used more extensively than the other types, possibly because they have been the subject of the greatest research. The principal use of these resins lies in the field of plastic molding under heat and pressure, where the purpose is the production of strong, rigid, inert articles which can be machined and take a high polish. For a number of purposes they are being used as substitutes for wood, glass, metal, porcelain, and hard rubber. Of late, their use as substitutes for natural gums and plasticizers in the better grade varnishes and lacquers, has grown considerably.

For convenience phenol-formaldehyde resins have been subdivided by Scheiber & Sandig in "Artificial Resins" 1931 according to usage into four classes: (a) Shellac substitutes, called novalaks; (b) Copal substitutes or oil soluble resins and (c) the heat hardening resins.

It was as a shellac substitute that the phenol-formaldehyde resins were first technically applied. Varnishes consist essentially of solutions of the resins in volatile solvents, which upon evaporation, leave hard resistant films on the coated surface. The coatings have the capacity of taking a higher polish and have greater spreading power than ordinary shellac. Furthermore, they may be incorporated with pigments, which is a distinct advantage. However, their use is somewhat restricted by the fact that the films ordinarily have less elasticity than those from shellac. At present, resins of this class are being used also in cellulose ester varnishes, to impart the properties of

luster, body, adhesion, and stability. It is said that they also impart protection against moisture and against bactericidal action, the latter a valuable characteristic in tropical climates.

Copal substitutes, or oil-soluble resins, consist essentially of the combination of phenol-formaldehyde resins with natural resins, such as rosin and rosin esters, or with other artificial resins, such as the coumarone resins, or with fatty oils. The use of oil soluble synthetic resins in the production of oil varnishes has advantages over the natural copals in that (a) uniform quality and great purity, (b) no previous gum-running process and (c) direct mixing with any pigments. Formerly, the serious disadvantage in the use of phenolic resins in oil varnishes was their non-fastness to light, darkening slowly with age. This defect has recently been largely removed, particularly in the case of the "rezyls." Phenolic resins are said to impart better brushing and covering qualities and longer life in outdoor exposure. They are now being used extensively in marine and insulation varnishes.

But it is to the characteristic of hardening under heat that phenol-formaldehyde resins owe their popularity and rapid progress. In the plastic molding industry, phenol-formaldehyde resins seem to be generally preferred when strong, rigid and inert products are desired. The properties of these molded articles, their high finish, their mechanical strength and electrical resistance are well known. Phenolic molding powders are obtainable in almost any shade or color, except white, and of a high degree of uniformity. The mechanical strength or brittleness of the finished article depends to a very large extent on the molding technique employed in its preparation. Essential are that proper temperature, pressure and length of dwell compatible with the composition of the molding powder be employed. Too high pressure often leads to mechanical defects and too high temperature tends to brittleness and a darkening of the color, particularly when spirit-soluble dyes have been employed in the composition. On the other hand, too low a pressure or temperature results in defective and mottled moldings due to incomplete flow of the resin in the mold.

Most of the ills of the manufacturer are found in the process of molding under heat and pressure. The waste caused by improper moldings is sometimes very high and requires expert supervision to hold this loss to a minimum. It is, however, sometimes very difficult, even for one skilled in the art, to determine whether the trouble is due to defective molding or to lack of uniformity in the resin composition.

One principal disadvantage of phenolic molding powders is their reactivity to light and tendency to darken slowly with age, particularly when exposed to strong sunlight. This defect, as in the case of phenolic varnish gums, has been corrected to a large extent in recent years.

Urea resins require for their preparation a somewhat more complicated procedure than phenolic resins; but the relatively low cost of the materials used result, in most instances, in resins considerably cheaper than the corresponding phenolic compositions. Solutions of urea resins with basic salts, such as sodium acetate, are widely used as colorless water varnishes, adhesives, impregnating and stiffening agents. (F. Pollak, German patent, 405,516, 1919).

The value of urea resins for varnishes, lacquers and enamels and for certain types of molded articles rests in their fastness to light, their transparency or milky appearance, and the ease with which they may be tinted to any desired shade. This fastness to light is of the greatest importance as it is rare among synthetic plastics.

Jars like the ones pictured are light in weight, save on shipping costs and practically eliminate breakage.

The disadvantage of urea resins lies principally in their low water resistance. It is also claimed that they do not form true end products when molded, but merely colloidal aggregates which continue their reactions after the molding operation has been completed. ("Paint & Oil Chem. Review", June 4, 1931.)

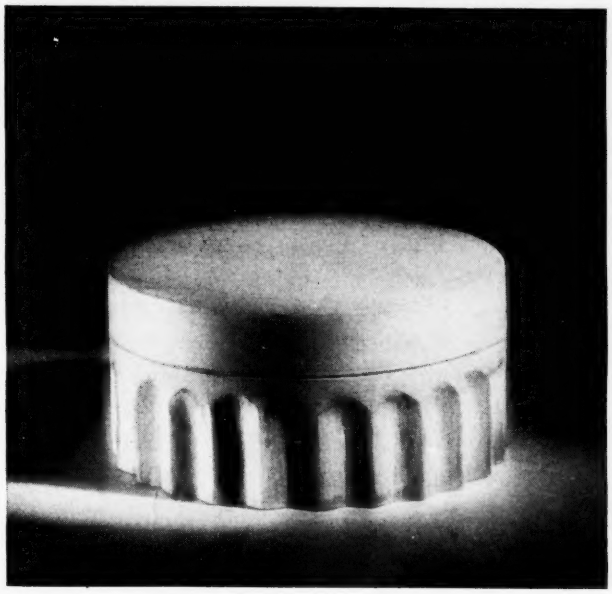
Urea-aldehyde resins resemble natural shellac closely. They are readily soluble in alcohol, but insoluble in hydrocarbons. They are sensitive to water, but like shellac, they eventually become insoluble. However, their advantages over shellac are complete homogeneity and uniformity, brighter color, and extreme fastness to light. Urea resins, known as "pollopos," manufactured in Germany, have wide application in nitrocellulose lacquers.

Molded articles from urea resins are characterized by their beautiful range of colors, their brilliant finish, ease and accuracy of molding and, of course, their fastness to light. However, they lack, as a rule, the mechanical strength and electrical resistance of the

phenol-formaldehyde resins. These inherent defects are being gradually overcome, so that urea resins are competing more and more with the phenolic products in every department.

Coumarone resins are polymerization products of solvent naphtha, a product of the fractional distillation of coal-tar. The resin, as first produced, is not of definite composition but consists of highly polymerized compounds of coumarone, indene, styrol, and other substances. No less than five different grades of coumarone resins are on the market, with melting points ranging from 50° C. to 150° C.

Their principal use is in oil varnishes. Oil varnishes of the most varied character can be produced from coumarone resins, in which respect they resemble the rosin esters. The films produced are strong and tough, but lack fastness to light. At high temperatures coumarone resin oxidizes rapidly and even at moderate temperatures it will in time discolor to a yellowish hue. In the case of enamels, except white enamel, this is of little account, and the other advantages more than outweigh this defect. Coumarone resins are also used extensively in the manufacture of linoleum, oil-cloth, etc. In the form of emulsions they are used in the sizing of paper and as a softener for rubber. As they



Molded plastic jars are now available to drug and cosmetic packers in every color, size and shape.

do not harden when heated they cannot be used in the molding industry, although they are sometimes used with other synthetic plastics to impart certain properties, such as dielectric strength.

Resins from polybasic acids and polyhydric alcohols are rapidly coming into prominence particularly in varnishes and lacquers. Probably the best known example of this type is the glycerol-phthalic anhydride or "glyptal" resin.

The condensation of glycerine and phthalic anhydride under the action of heat takes place in three stages, somewhat resembling that of the phenol-formaldehyde resins: (1) an A stage resulting in a brittle resin soluble in certain solvents. (2) a B stage resulting in an insoluble gelled product but softened by solvents and (3) a C stage which results in a hard, tough, insoluble product. In comparison with phenol resins, the glyptal resinoids are only produced after long heat treatment at about 200-250 C., so that such resins have not found extensive application in the molding industry. However, they possess definite advantages over the phenol-formaldehyde type on account of their superior adhesion and color fastness. For these reasons, glyptals have found considerable application as vehicles for the production of stoving lacquers and enamels. Glyptals have also found extensive use in nitrocellulose lacquers, in the manufacture of floor coverings, and in coil insulation.

A series of glyptal resins, said to be compounds of the glyptal complex with drying oils, are now being marketed. It is said that these form valuable vehicles for the preparation of paints, enamels, varnishes and undercoats which are characterized by high durability, retention of gloss, high resistance to chalking, rapid drying, excellent adhesion and flexibility, and great permanence in all colors.

The glyptals, like the urea resins, have relatively low water resistance. Also at elevated temperatures (150-200 C.) they show a decided tendency to discoloration. Glyptals have been produced which are suitable to some extent for molding. This has been accomplished by prior curing and the use of plasticizers, such as glycol succinate. This is only one example of how modern research is widening the field of application of the synthetic plastics. ("Chem. & Met. Eng." Aug. 1932).

The Industry's Bookshelf

The Metals; Their Alloys, Amalgams and Compounds, by A. Frederick Collins, 319 p., published by D. Appleton and Co., N. Y. City. $2.

A popular handbook for layman and student, it gives the complete story of the metals, describing them exactly and telling of their discoveries and how and when they were first found. Despite its popular and delightful style, the book is really an authoritative reference book on the metals.

Organizing and Financing Business, by Joseph H. Bonneville and Llloyd E. Dewey, 467 p., published by Prentice-Hall, N. Y. City. $5.

The primary purpose is that of a textbook for colleges and universities, but executives desiring to better acquaint themselves with the basic fundamentals of business finance will find this book instructive and enlightening.

Economics, by Fred Rogers Fairchild, 544 p., published by American Book Co., N. Y. City. $1.60.

While primarily designed as an elementary text for high schools, this book is ideally written for the business man who wishes to obtain an insight into the science of economics. The present edition has been thoroughly revised in the light of present day conditions.

First Aid to the Executive

By W. L. Batt

Whether in office or plant, the planner and administrator can get practical guidance in making his decision from the figures of the accounting department if—they are translated into the terms of production and sales. This article by Mr. Batt, president of the SKF Industries, was abstracted from the 1932 Year Book of the National Association of Cost Accountants.

As I look back, now almost two generations, I remember the work of two distinguished engineers, Frederick Taylor and Carl Barth, who promulgated the theory of scientific management. At least all the older men in industry remember the hullabaloo it created. It was the most heartily damned doctrine on the one hand, and the most devoutly praised doctrine on the other hand that you could conceivably find. It was, however, a little bit misleading in that it confined itself almost entirely to factory management.

Taylor lived and died, and perhaps because of a general cyclic trend, I have always felt that his work stopped just short of completion. On his insistence, we dissected the factory, upside down and backward. We analyzed our productive methods, even to the point of photographing the motions incident to doing a job in the most efficient way. We analyzed every step that goes into the completion of the finished article, and finally "costed" it.

The War came on and we had only to run just as hard as we could to keep out in front. Then subsequent to that came the very brief reorganization period of 1920 and 1921 and the building of the boom period which culminated in 1929.

The management of business, the business side of business, hasn't had to worry very much, over those periods, as to the income side of its balance sheet. By and large, it hasn't taken any very unusual amount of effort to run a reasonably productive business, and I am quite satisfied that up until the end of 1929, a lot of us heads of businesses thought we were pretty good.

Now, of course, our balloon, just like others, has been sadly punctured, and we are asking for help. We recognize now, I think, as executives, that the management side of business is going to be subjected to the same critical, intelligent scrutiny that characterized the examination of the productive side of business a few generations ago.

It is my definite opinion that the efficiency in the production of goods has far outstepped the efficiency in the distribution of goods, and I insist, therefore, that it is a major problem of the next generation to attempt to lessen that wasteful spread between the cost of a finished product at the factory door and the cost of that same product to the ultimate consumer.

I do believe that we should be able to compete with the rest of the world successfully, but we shall not be able to unless and until we have known our final costs substantially. But, dismissing that question for a moment, I am satisfied that we shall not be able to solve our own internal economic problem until we shall have substantially brought nearer together that great volume of potential consumption, the agricultural industry, and the large production group represented by industry in the cities.

I don't allow the problem to stop with the farmer, because I am a great believer in international business. I do not think that the United States can live behind a wall without doors. Neither do I believe it can live behind the wall with doors that open only one way. We are experiencing the very acute financial disturbance today which results from financial doors that tend to open one way. We have sent a very large amount of our surplus accumulation out of the country and have found no means for it to come back. It is a definite fact, of course, that the cost of products of most industries in other countries is far beneath our own, and we good Republicans have sat rather complacently behind a huge wall, protected, maintained, and continually made higher for our benefit. I don't believe that condition can continue to go on.

Therefore, I say again, from that point of view, that the final cost to the consumer has got to be lower. That is distinctly a management question, and it is

one with which average management is not perhaps too well equipped to deal.

It has been for many years an accepted requirement that our engineers shall be technically trained people, that our laboratory, our research people shall be scientific people. Our sales people have had either that background of sales experience which comes as a result of years of observation of results in sales methods, or have studied by one means or another the requirements of sales. And so with the production people toward whom the last two generations of intensive effort has been directed. I am, however, quite definite in saying that I believe management is as a whole the least equipped to deal analytically with its problems.

That being the case—and many of us are quite free to admit it—we ask for help. It isn't too comfortable to sit up on the top of a platform by yourself and not know what is going on around you. The average executive, and I have heard many of them express this view, has had a certain lonesomeness. It has been my own feeling. One didn't know exactly what his organization was thinking. He had no very dependable means of finding out. He had a mass of figures before him that were too old, too stale, too meaningless, to mean anything, even assuming that he could understand them, which of course most of us executives can't do.

So as we have looked about our organizations for help in interpreting the significance of these figures, where have we turned? We have turned to the only department from which we could expect to get help, the accounting department, and we have all too frequently been sadly disappointed. I don't think that is at all surprising. I don't believe that controllers are very apt to grow out of cost accountants, unless they change their point of view. Let's for a moment analyze the requirements of those two groups of people.

Efficiency in Meticulous Detail

We require in the cost accountant a man given to meticulous detail, a man who shall be thorough, a man who shall be a mathematician. I don't need to amplify those qualifications, because they are quite familiar. The requirements of the controller are essentially different. He must, of course, be able to interpret those figures, and further, I should say he must know how they are made up. Presumably, therefore, they are apt to be prepared under his general direction. But that is not his principal qualification or characteristic. He has got to be a man of imagination. He has to be a man who is a student, and even something of a psychologist. He has to be more things than we have been accustomed to looking for in one man.

The suggestion was made that the controller should present to the chief executive all his data. That is all right. He can get along so far with that, but of course he won't be a complete success if that is the way he handles his work. He must be in touch with the department heads. He has to work so quietly, so efficiently, and so cooperatively, that what finally gets up to the chief executive may not be credited to him at all, but results will have been accomplished and he will have the support of the organization with which he is working.

The trouble with too many controllers is that they have tended to run too quickly to the front office, and have perhaps been inclined to become irritated if all of their suggestions were not adopted.

Why We Have Department Heads

Now you know the best starting points for working out any suggestions in a large modern corporation is with the man who knows much more about them than the chief executive does. The man to work out the power house problem is not the chief executive, because all he knows about boilers is that he has some. The man to work that out with is the superintendent of the power plant. When he realizes the controller is anxious to help him, will let him get credit for the results, if you please, then you will find, nine times out of ten, enthusiastic cooperation, and without anybody knowing very dramatically about it, that particular problem finds itself solved. Perhaps the chief executive never knows anything about it directly, except that the figures begin to look good.

The accountant must be resourceful, must be tactful. I can't emphasize that enough. I emphasize that, because the controller has in his hands all the resources, all the information, which anybody can have. He originated it. He put it together. If it is the 25th or 31st of the month when that material comes out, it is his fault, nobody else's but his. If, when it comes out, it is so stale it is of no interest to anybody else and of no value to him, that is his fault.

Of course, it is perfectly foolish to blame the accounting department for this situation, and I don't. It has been a natural outgrowth of a situation in which we asked for balance sheets as a matter of legal or credit requirement. Executives knew they had to have them, and they came along and they were stuck in the drawer, and that was all right.

The demands which are being made on the controller now are being made because management realizes that "there is somewhere in them hills some gold." And it looks to the accounting department to dig it out without knowing quite how or when or how much.

I like the idea suggested by Mr. Pinkerton, that the controller shall be the man who sits off in a somewhat detached way, detached in the sense that he is not burdened with too much routine responsibility and tries to see where the business is going. I am sure, however, if he is to see where business is going, he has to have intelligence with which to interpret that to himself first and to his associates around him. I am

equally satisfied that no successful controller can be a man who is not studying, for example, questions of economics. I am equally satisfied that he will be a man who knows what is going on in the factory. He will be studying management methods, as carried on in other businesses.

That is a very large order to lay at the door of one man. I say to you very sincerely that the largest single opportunity in any business in the next generation, lies at the door of that man who will fit himself to do these things which we have suggested to you that the controller ought to do.

I don't like the title. I think it is very unfortunate. I have turned over in my mind the need for another name. I have not found a successful solution, but I only ask you to see if there is not a name which is better fitted for those functions than "controller." If you use the old French term, "comptroller," that is too awkward. A good many people can't understand it. If you use the simplified English spelling, "controller," that looks as if it is assuming a little too much at the outset. There should be some title which will describe this staff officer, which should clearly indicate to the profession the requirements which he must meet.

Business faces the greatest problems in the next generation which it has ever met. The spectacle of idle plants anxious to work; of men, with wives and children, out of employment, anxious to work; of capital, anxious to be employed; and all those three units standing around on separate corners wringing their hands. If industry, if society, can't find a better solution than the one we have had, a better one will be forced on us.

I don't know any part of a business from which that solution is more apt to come than from men who are in position to study the trends of businesses. I am not so critical as to lay the responsibility of this depression at your door, because you haven't utilized the figures which you had; nor do I lay it at the door of management because it hasn't utilized your figures. But I do say that in some way, somehow, through intelligent teamwork within, first, the organization, second, the industry, and third, society, some kind of a solution must and can be found.

New Uses Wanted for Arsenic

At the recent annual meeting of a European ore-mining company, it was revealed that 400,000 tons of arsenic ore per year would be dealt with as from the commencement of 1833. The ultimate destination of the enormous quantities of arsenic to be produced is an outstanding question.

It is hoped that the company concerned will find new uses for arsenic which will make it possible for them to dispose of their stocks on the world market. This being unsuccessful, arsenic will only follow in the footsteps of mercury. In both cases there is an attractive opening for chemical invention.

At present arsenic is being used in medicinal preparations; in lead alloys for bullets and shots; pyrotechnic and boiler compositions; as a depilatory agent; manufacture of paint pigments, opal glass and enamels; textile dyeing; calico printing; bronzing agent or decolorizing agent for glass; for insecticides, vermin poisons, sheep dips.

Zanetti Nitrogen Report

The long-heralded Zanetti Report on the Chilean nitrate situation (financed by the Chemical Foundation) is out. The industry, frankly expecting startling disclosures, the result of Prof. Zanetti's secret three months sojourn in Chile, is disappointed.

Chapter I of Prof. Zanetti's book is devoted to an historical review of nitrogen in general; chapter II deals with the Chilean nitrate industry, general and historical; chapter III goes into an elaboration of the synthetic nitrogen industry, its history and types of processes. In all three chapters the material is not unknown to those connected with chemical industry but the book has been frankly designed for the general public.

Chapter IV takes up "The U. S. and the Nitrogen Problem." Chiefly interesting is the disclosure of the "fortuitous circumstance" that permitted the U. S. and the Allies to obtain Chilean nitrate during 1917-1919 at reasonable prices.

Prof. Zanetti's dynamite is reserved for the concluding chapter. "The Chilean industry's only salvation lies in the destruction of our fixed nitrogen industry and we may expect every effort in that direction by outright 'dumping' in our market." He follows this explosive conclusion with still another one more deadly:

"Unless such destruction be achieved and Chile then again be in control and able to raise prices to profitable levels, we may consider the Chilean nitrate industry as an obsolescent one, which can continue to exist only by toleration and the influence exercised on the synthetic producers by the banking houses deeply involved in Chilean affairs. Eventually it should join the museum of discarded industries . . ."

The Guggenheim process comes in for a share of Zanetti's fire. "The tremendous over-head of the Guggenheim plants has set at naught the claims of economy in mechanical production and the lowered consumption of Chilean nitrate has thrown out of gear all the calculations based on a production of 2,600,000 tons of nitrate a year."

The Columbia Professor arrives at a U. S. delivered Chilean nitrate cost of approximately $27 a ton. With nitrate selling in this country at $24-$25, he concludes that no matter what reorganization of Cosach takes place, that Chile's place in the nitrogen field is fast receding to one of very minor importance. One outstanding weakness in the survey, as pointed out by export chemical engineers, is the complete lack of data on synthetic nitrogen manufacturing costs. One such engineer—a leader in the consulting field—points out that $21-$25 nitrate may not be any more conductive to long-livity on the part of synthetic manufacturers than it is to natural producers. However, Prof. Zanetti does not lay any claims to originality for his work—his was a job "of interpretation, educational rather than technical." After the rumors that have kept chemical industry holding its breath for months, expecting new disclosures and new facts the most general query is "Why did he have to go to Chile?"—with H. Foster Bain's 1924 report; Jasper E. Crane's "Industrial Chemistry's Greatest Triumph" (Chemical Markets, July, 1930, p. 25); Harry A. Curtis' A. C. S. Monograph, "Fixed Nitrogen"; and particularly splendid pictures in *Fortune's* August number available?

By far the most entertaining part of the booklet is the preface written by the Foundation's head, Francis P. Garvan:—

"American chemical industry, from the small beginnings of 1914, has been built up by the American people—The world is combining to destroy it! . . . Modern national defense is based on the airplane industry, plus the chemical industry—the gun and the load." Mr. Garvan writes also of secret agreements signed in the last week of November by the European nitrogen companies and by Cosach designed to destroy America's present nitrogen independence. "So secret were the proceedings that only one copy was signed by the different companies involved and then only with initials, and this secret copy was deposited in a safe deposit box in Germany."

Ceramics in Japan

By Chas. E. Mullin, D. Sc.

CHEMICAL and other industries of Japan are more extensive and better developed than those of any other part of the Far East so their study of more importance. Remember that although all manufactures have expanded tremendously in Japan during and since the war, almost without exception the most modern plants are copies of either European or American plants. On account of the abundance and low cost of labor in Japan, as compared with the United States, most plants more nearly resemble those of Europe. Even today in Japan it is possible to obtain good factory labor for one yen per day (about $0.30 U. S.), or even considerably less. For this reason it is economically absolutely impossible to install many of the labor-saving machines in Japan that are essential in America.

It is desirable to mention again that the statistics do not cover plants employing less than five people. Those not familiar with the so-called "home industries" of Asia may be inclined to believe that this branch of industry amounts to nothing. In actual fact there are an enormous number of these tiny producers. They are sometimes a very considerable factor in the domestic market. On the other hand, they seldom figure in the export market. Of course these home industries do not come under the same governmental supervision as the larger plants, so that they often work long hours and under conditions such as could not be tolerated in larger industrial plants. Frequently the head of the home factory has served a long apprenticeship in the industry and has been forced to go into home production through lack of employment. These plants are often very picturesque and even more interesting than the larger, modern factories.

Japanese industries display almost total lack of originality. Almost all older Japanese arts and industries came from China or Korea, many of them with the Buddhist religion. A few came from India. Practically all of the others were either brought to them by the foreigners, or were brought home by Japanese who had lived or studied abroad. The fact that Japan has so far merely imitated is well recognized by some of her leaders who discussed this subject with the author, and more than one stated that their success in the future depends entirely upon the ability of the Japanese to originate, rather than copy. Some of her ablest scientists appear to be somewhat doubtful of the future in this respect.

Every phase of the ceramics industry is found in Japan and the manufacture of pottery is of very great antiquity, dating even before the time of Jimmu (660 B. C.), the first Japanese Emperor. Records show that during the reign of Yuraku, in the year 462 A. D., a Korean manufacturer of earthen ware arrived in Japan and that the present industry dates from the reign of Kanmu (782 to 805 A. D.). The influence of the early Chinese on the Japanese industry is shown by the fact that in the reign of Goshirakawa (1156 to 1158 A. D.) a native of the Isa province by the name of Goro Daisuke brought the manufacture of porcelain to Japan from China, and one Kato of Seto went to China in 1223 to study pottery manufacture, remaining for five years. A Chinese by the name of Sanpei Li was naturalized in Japan in the Keicho era (1596 to 1614) and manufactured porcelains in Arita, Hizen province. His methods were later copied in all of the plants of that time. Even today the Japanese do not seem to have originated anything new in the manufacture of these wares but have adapted or imitated European

and other processes. A recent article on the industry states that "In the early days of the Meiji era (1868 to 1911) a new epoch was marked in the pottery industry of Japan by the clever and attentive addition of new western knowledge and methods to those then existing in this country."

In 1928, the latest census figures available, there were 6,862 pottery plants employing 47,108 workmen, and producing products to the value of 76,726,018 yen (approximately $38,363,009.00). Of this value 43,994,120 yen ($21,997,060.00) or about 57 per cent., was table ware and the territory around Aichi produced pottery manufactures to the value of 35,815,977 yen ($17,907,989.00). The Japanese exports of pottery products in 1929 were valued at 36,962,000 yen ($18,481,000.00) and went mainly to the United States, Dutch East Indies, India, China, Canada, and Australia.

Japanese Ceramics Production

(Value in 1000 yen)

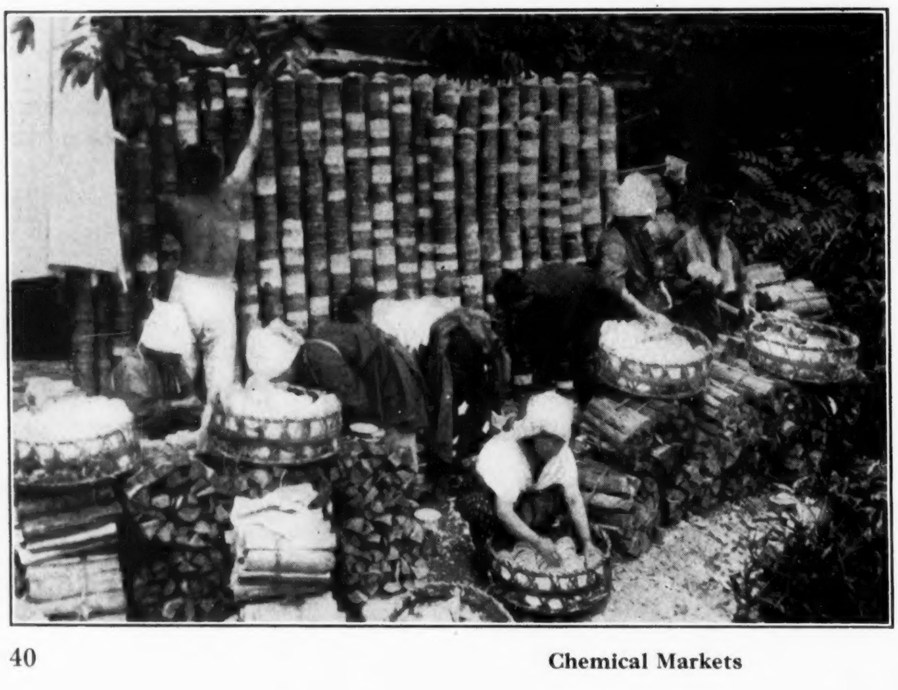
Year	*Porcelain & Pottery*	*Enameled Ware*	*Bricks*	*Tile*	*Clay Pipes*
1926........	73,971	168	14,738	38,704	3,553
1927........	74,363	140	10,578	34,425	3,729
1928........	76,726	123	10,809	34,120	4,542

The leading companies are the Nippon Toki, Nagoya Seito, and Matsumura Koshitsu Toki. About 12 per cent. of the total production is from the Gifu district. The Kyoto district is noted for its decorative wares, and Saga for Arita and Imari porcelain. Banko porcelain is made in the Miya district and the Kutani porcelain in Ishikawa. Most of the foreign style crockery for export is made in the Aichi prefecture, of which Seto is the leading center. Arita porcelain is considered the finest, from the artistic standpoint, followed by Satsuma and Kutani ware. As would be expected, the industry is located near the sources of the clays used, many of which are naturally very well adapted for special purposes.

Primitive habits abound in Japan—note the painstaking manner in which this potter sits at his wheel in a plant at Tajimi, near Nagoya.

The hours of labor are long, usually from daylight until dark, and the wages low. However, even the small plants often use quite modern chemical processes and methods, especially where this does not involve the use of additional machinery.

There are several Higher Technical Schools giving specialized courses in ceramics, one of the finest being located in Kyoto. The government supports an excellent technical laboratory in Yokohama to assist the manufacturers in the development of new products, especially for export, and in solving their problems. At both Kyoto and Yokohama assistance is given in design problems, as well as in the chemical and mechanical problems.



Japanese ceramics are among the most beautiful in the world, female help contributing largely to their manufacture. Here we see some of the workers piling up saggers after being used to bake porcelain.

Much of the value of high grade porcelains depends upon the beauty of the decorations, and in this respect the Japanese have a distinct advantage in that they appear to have, in many cases, a more highly developed sense of color harmony and beauty than is found in some other countries.

Japanese Pottery Exports

(In thousand yen)

To	*1929*	*1928*
China	2,301	2,068
Manchuria	1,601	1,476
Hongkong	650	626
British India	2,559	2,456
Straits Settlements	712	588
Dutch East Indies	4,928	4,823
Philippine Islands	667	794
Great Britain	517	469
France	636	521
Holland	1,028	775
United States	14,501	13,793
Canada	1,650	1,420
Argentine	388	314
Brazil	415	442
Australia	1,159	1,172
Others	3,247	669
Total	36,963	34,643

Molded tiles are fired in small lots in a very crude kiln built of clay with straw as a binder. Wood is used as fuel, mostly small branches and refuse.

The exact date when glass was first made in Japan is not known but, as glass articles were found in the tomb of Emperor Nintoku (313 to 399 A. D.), it is assumed that this industry has existed in Japan for more than 1600 years. It is recorded that glassware was manufactured by imperial order in the reign of Emperor Monbu (697 to 707 A. D.) but the industry appears to have declined considerably at a later date and during the Tokygawa Shogunate period (1603 to 1867) glassware was imported from Portugal and Holland. Later some plants existed in Nagasaki, Osaka, and Tokyo, but the development of the modern glassware industry in Japan appears to date from about 1876 when the National Department of Industry established the Shinagawa Glass Factory, which manufactured articles of glass under foreign instructions. Although this factory was later closed, it influenced the development of the industry in Japan to a very considerable degree. As in the case of most Japanese industries, the war had a considerable effect upon the glass industry. Previous to the war, the total output of glassware was about 7,000,000 yen (about $3,500,000). This reached its height in 1919 with a value of 64,360,000 yen. In 1920 this decreased to 56,221,000 yen, in 1924 to 52,539,000 yen, and in 1925 to 50,542,000 yen (about $25,271,000.00).

In 1928 there were 527 glass factories in Japan, employing 19,988 workmen, and manufacturing products to the value of 44,681,065 yen (about $22,340,532.00). Of this amount, the bottles amounted to 17,026,590 yen and the sheet glass 15,145,425 yen. Of the 13,210,519 yen of glass and glass manufactures exported in 1929, the window glass amounted to 383,545 yen, the bottles 4,099,229, the spectacles 291,710, beads 774,729, and mirrors 2,213,640 yen. The leading production centers are Osaka, Fukuoka,

Kanagawa, Tokyo, and Hyogo prefectures, named in the order of decreasing importance.

Japanese Glass Exports

(In thousand yen)

To	*1929*	*1928*
China	2,548	2,690
Manchuria	635	599
Hongkong	804	866
British India	4,086	3,834
Straits Settlements	496	448
Dutch East Indies	1,932	1,697
Philippine Islands	833	1,155
Great Britain	33	39
United States	281	187
Cape Colony	139	152
Australia	615	771
Others	808	983
Total	13,211	16,631

Cement

The cement industry is of recent date, the first Japanese cement plant being built by the government in 1871 at Fukagawa in the Tokyo district. This was followed by a private plant at Yatsushiro in the Kumamoto prefecture in the same year, a plant at Onoda in the Yamaguchi in 1881, another at Nagoya in the Aichi prefecture in 1887, and plants at Kamiiso, in the Hokkaido prefecture, and at Tokyo in 1890. Many other plants followed until there was a considerable overproduction—but this was entirely wiped out by the heavy demand after the earthquake of 1923. The increasing number of fire-proof buildings and the rapid growth of the hydro-electric industry served to keep the plants busy until 1926. Due to the large stocks on hand by practically all producers, they agreed in July 1927 to restrict production by 32 to 35 per cent. which, with the increased demand in 1929, resulted in a considerable improvement in the financial situation in the industry.

The latest statistics of the industry (1931) show 17 companies, with 31 factories, and a normal capacity of 20,652,000 barrels of cement. The production in 1928 has been given as 22,474,062 barrels with a value of 88,156,414 yen ($44,078,207.00) and in 1929 as 25,140,701 barrels. At one time considerable cement was exported from Japan but this gradually decreased, largely due to increased competition by English and German portland manufacturers in the Indian and South Seas market. The present export markets are the Dutch East Indies, Hongkong, the Philippine Islands, and the Straits Settlements. The 1929 exports were valued at 9,182,000 yen ($4,591,-000.00).

Enameled Iron Ware

The Japanese production of enameled iron ware (*shippo*) has increased from about 200,000 yen in 1911 to 8,814,871 yen ($4,407,435.50) in 1928. As shown by the table below, most of this material is for export, the chief export markets being China, the South Sea Islands, and British India. The principal items exported are wash-basins, plates, jars, and cups. The principal centers of manufacture are the Osaka, Mie, Tokyo, and Hyogo prefectures.

Japanese Manufacture and Export of Enameled Hard Wares

Year	*Production*	*Year*	*Export*
1926	yen 9,028,755	1927	yen 5,933,026
1927	7,097,221	1928	6,444,177
1928	8,814,871	1929	6,707,272

World's Largest Magnesite Reserves

The future of Manchuria (or Manchukuo) is now one of the affairs which are attracting world attention, so that an account of its natural resources and chemical industry is of much interest.

Of all the mineral products of Manchuria, coal heads the list, total production in 1930 amounting to ten million tons. The principal coal mines are at Fushung, Yentai, Hsintai, and Penchifu. The smaller coal mines number almost fifty. The Fushung mine is the largest of all, and the annual output is about seven million tons. It is situated about thirty-two kilometres east of Mukden, and the reserves are estimated at one thousand million tons. Open-cut mining is carried out on a very large scale in the western part of the mine. The mine has been worked by the South Manchuria Railway Co. since 1907 in consequence of the Russo-Japanese war. The coal is bituminous, rich in nitrogen and volatile matter, but lacks caking power.

Fushung is the centre of all the industries related to coal. The shale-oil plant was put in operation in March, 1930. The oil-shale is found, covering the coal bed, in a thickness of more than a hundred metres, and is estimated to contain about 5,400 million tons. Its oil-content is comparatively low (about 5.5 per cent. on the average), but the mining is cheap, because the oil-shale must necessarily be removed in order to get coal by the open-cut mining. For the dry distillation of oil-shale, special internal-heated ovens were devised and erected. At present the plant has a capacity to treat 4,000 tons of shale a day, and the annual production is 50,000 tons of heavy oil, 5,000 tons of pitch-coke, 15,000 tons of crude paraffin, and 18,000 tons of ammonium sulfate.

Iron deposits are situated chiefly in the districts a little south of Mukden, and are composed of metamorphic rocks of hematite or magnetite mixed with quartzite. They are mostly very poor ores, containing about 35 per cent. of iron; and extraordinary efforts had to be made by the laboratories of the South Manchuria Railway Company before the present process of metallurgy could be carried out with reasonable cost at Anshan ironworks, the largest in Manchukuo, where 200,000 tons of pig iron are annually produced. In this process the poor hematitic ore is changed into powdery magnetite by the partial reduction in a reducing-furnace where producer gas is introduced; then magnetic separation is applied and the rich ore containing 50-60 per cent. iron is obtained. It is now contemplated to establish a large steel-works at Anshan. Next to Anshan, pig iron is produced at Penchifu; about 65,000 tons in 1931.

Of the non-metallic resources of Manchuria, quartzite, fireclay, limestone, and magnesite are exceedingly abundant, the last of which, above all, is found at Tashihchiao and Tapingshan, and is said to be the largest magnesite deposit in the world. The areas already surveyed indicate that 500 to 600 million tons of magnesium is contained in the hills, and the content underneath the surface is practically inexhaustible.

About 25,000 tons of salt are now produced by solar evaporation along the coast of Liaotung peninsular, and investigations are proceeding as to the improvements in both the yield and the quality of salt. Japan itself lacks salt for industrial use.

—The Chemical Trade Journal

Controlling Nitric Acid Corrosion

An 18 per cent. chrome-iron all-welded separator for recovering nitric acid from fumes. Courtesy Industrial Welded Alloys, Inc.

By Richard Tull
of Electro Metallurgical Company

THE well-known resistance of 18 per cent. chromium steel and 18-8 chromium-nickel steel to atmospheric corrosion has possibly obscured to some extent the many other valuable properties of these two alloy steels. The popular mind which immediately associates these metals with building trim, kitchen equipment, automobile hardware, etc., little realizes that there are few industries which have not found many applications for both of these alloys where particularly adverse conditions are encountered. Their resistance to many corrosive acids, salts and organic compounds, and their strength and resistance to oxidation at elevated temperatures, have resulted in design engineers specifying their use in many types of corrosion-resisting and high-temperature equipment.

The 18-8 chromium-nickel steels have found particular application in many fields where the corrosive action of nitric acid is encountered. In the chemical industry nitric acid is used in many processes, especially in those resulting in the following products: explosives, imitation leather, artificial silk, paper, and rubber. Although the austenitic chromium-nickel steels are not resistant over the entire range of nitric acid concentrations at all temperatures, they are practically unattacked in 30 to 70 per cent. concentrations of the boiling acid. The development of these steels has made commercially possible the conversion of ammonia into nitric acid by an oxidation process.

The use of stainless steels for nitric acid resistance is only one of their many applications in industry, but in a measure it reflects their wide use. It is felt that a brief review of some of the many valuable properties of these alloys will suggest other uses for corrosive and high-temperature service which will result in better products, in reduced costs or in increased production.

Both the 16 to 18 per cent. chromium steel and the 18-8 chromium-nickel steel are non-hardening alloys. In drawing and forming operations they will become hardened by cold work but it is impossible to harden them by heat-treating methods. Both steels are extremely ductile and may be readily formed into desired shapes by rolling, drawing, bending, etc.

The straight chromium steel usually contains about 17 per cent. chromium and 0.10 per cent. carbon, and in the annealed condition has a tensile strength of approximately 75,000 lb. per sq. in., a yield point of 40,000 lb. per sq. in., and elongation of 25 per cent. in 2 in., a reduction of area of 55 per cent. and a hardness of 170 Brinell. While it does not possess the extreme corrosion resistance of 18-8 steel, it is particularly recommended where a workable alloy of high corrosion resistance is required at less cost than the 18-8 variety. Long time corrosion tests show that 15 to 18 per cent. chromium steel is entirely unaffected by acetic, citric, nitric, picric and many other acids.

This steel is well adapted for high temperature service since it has been found to be extremely tough and shock resistant at temperatures from 800 to 1200 deg. F. In designing apparatus for high temperature work, short time tensile tests at temperatures are not indicative of the metal's performance in service, and for this reason data on the creep strength of metals is of utmost importance. Steel containing approximately 17 per cent. chromium has a limiting creep stress of 7,000 lb. per sq. in. for a one per cent. creep in 100,000 hr. at 1,000 deg. F. as compared with 3,000 lb. per sq. in. for 0.45 per cent. carbon steel.

The 18-8 chromium-nickel steel in the annealed condition has a tensile strength of 85,000 lb. per sq. in., a yield of 40,000 lb. per sq. in., an elongation in 2 in. of 55 per cent., a reduction of area of 65 per cent., and a hardness of about 135 Brinell. Cold rolled strip with a tensile strength of 180,000 lb. per sq. in. and an elongation of 5 to 10 per cent. in 2 in. can be obtained. This steel is more resistant to corrosion and scaling at high temperatures than the straight chromium steels. It is well adapted for high temperature service up to 1,300 deg. F.; above this temperature it tends to become brittle. At 1,000 deg. F. it has a limiting creep stress of 14,000 lb. per sq. in. for a one per cent. elongation in 100,000 hr.

Both the 16 to 18 per cent. chromium steels and the 18-8 chromium-nickel steels are well fitted to meet specifications in the oil refining, and other industries requiring an alloy for high temperature and pressure service with resistance to acid corrosion. These alloys are used extensively in chemical plant equipment, nitric acid plants and tank cars, annealing boxes and covers, oil refinery apparatus, furnace and boiler parts, and for many types of apparatus in the food and dairy industries. The rapid acceptance of the high chromium and chromium-nickel steels since their relatively recent development is a tribute to their superior properties, which insure longer life and decreased operating costs.

Synthetic Resins in Textile Fabrics

The various references in the technical Press to the discovery of a process of treating cotton and artificial-silk goods to render them less susceptible to creasing, and, in the case of the latter fibre, also to impart increased strength in the wet state, indicate that a more detailed discussion is desirable. The history of the finishing of cotton goods is remarkable for the paucity of outstanding discoveries. Mercerization, the Schreiner finish, and the straight and modified Heberlein finishes probably represent the chief surviving processes among the host of innovations of the last 100 years. The basis of the new discovery is dependent upon the use of a synthetic resin, but no information is available concerning the particular type which has been found to be most suitable for the purpose.

The "Anti-Crease" Patents

The relative patents refer to the uses of the phenolic and urea-formaldehyde types. The salient features in the respective specifications (E. P. 291,473-4) are concerned with the application of (*a*) a pre-formed reasonably stable hydrosol of an initial resinous condensation product, and (*b*) the formation of both initial and final condensation products within the fibre itself. Exterior coating of fibres is not claimed. E. P. 304,900 refers to a particularly advantageous mode of procedure in which a phenol-formaldehyde reaction mixture is specified—*e. g.*, . . . "the fabric to be treated is first thoroughly treated (swollen) with caustic soda, with or without tension . . . excess soda is removed, and the fabric squeezed until it contains 100 per cent. or more of water . . . the wet, swollen fabric is then mangled with a mixture of 100 parts phenol, 100 parts 40 per cent. formaldehyde, and four parts potassium carbonate, the ingredients being previously boiled together for five minutes, and cooled rapidly. The cloth should retain 100 per cent. liquor. It is dried, and then heated for two minutes on drying cans at 170° C. Finally, it is soaped to remove excess reagents, rinsed, and dried."

The idea of using synthetic resins in textile finishing processes is not new, but the reference in the latter patent to treatment of the fibrous material in a wet, swollen state is an interesting innovation. The quantities of reagents given in this example correspond to about equimolecular proportions of the active agents. When this mixture is heated at 100° C. for some time, an intermediate condensation product is formed, which, as usually prepared in substance on a technical scale, has a rubber-like consistency while warm, and is soluble in various organic solvents. Recent investigations (cf. G. P. 516,677), however, have shown that the initial condensation product is dispersed throughout the reaction mixture in the form of an emuslion. Further heating causes the dispersed particles to coalesce, whereby an irreversible colloid is formed, corresponding to the well-known "gum" intermediate product. This is exceedingly difficult to purify, but according to the patent quoted, the addition of a dispersing agent (protective colloid) in the initial stage of the process, gives a stable emulsion of "oily" particles, which, on further reaction, may be precipitated as a finely divided condensation product. An additional brief period of heating at 150°-185° C. causes it (or the ordinary "gum" product) to change into a hard, insoluble, infusible polymer.

The presence of excess of water in the impregnated fibres (anti-crease example) during drying, probably causes a deposition of the initial condensate in a highly dispersed state throughout the fibre mass. In other words, the average size of the particles will be exceedingly small compared with that of particles made in the normal manner. There is the possibility also that the fibre itself may here act in a somewhat analogous manner to that of the protective colloid mentioned in G. P. 516,677, thus preventing the minute particles from coalescing to a coarse, impure product. Other factors which would exert a favorable influence on the physical state of the type of product discussed are the high wetting-out efficiency of the reaction mixture and the comparatively large surface area of the swollen cotton.

Numerous innovations to be made in the near future are possible, especially in calico printing as well as in finishing practice. Indeed, the production of special types of chemically inert substances *in situ* affords great scope in this field of industrial research. Probably the chief need at present is for substances which are highly resistant towards washing, have a low water-absorption figure, are fireproof, and remain colorless on exposure to light and air, while retaining flexible and elastic properties of a high order.

Value in Viscose Artificial Silks

Some details about the anti-crease process have been received from which the following is quoted: "Although the word 'creaseless' has been applied in the daily Press to the new process under discussion, this property is not claimed by the company, as completely creaseless materials would not have the requisite textile properties. The new property is better described as a combination of resistance to and recovery from creasing. The process is based on the incorporation of a synthetic resin in the textile material, and is a final process following on bleaching, dyeing, or printing. The amount of resin employed expressed as an increase in weight on the original material is not critical, 15 per cent. being a good average figure. The technical advantages of the new process are: Woven and knitted fabrics of cellulose material approach wool or silk in their resistance to and recovery from creasing, without detracting from their draping qualities or handle. The dry strength of regenerated cellulose is increased, while its wet strength shows a great increase. The weight of the material is increased by an average of 15 per cent. Experience shows that in some cases 10 per cent. or more may be taken from the raw fabric during processing, but if the anti-crease process is applied, a cloth having similar cover to the original cloth is obtained, apart from the advantages of the process in the directions indicated. The normal tendency to slip and laundry shrinkage is reduced."—*Abstracted from The Chemical Trade Journal.*

Health Hazards in Food Fumigation

By C. L. Williams

Senior Surgeon, U. S. Public Health Service

FROM figures furnished by manufacturers of fumigants it is estimated that during 1931 in the United States 700,000,000 cubic feet of building space (mostly warehouses, flour mills, etc. containing foods), 500,000,000 pounds of commodities (mostly foods, in fumigation chambers), 4,000 ships (many of them loaded), and 7,000 railway freight cars (loaded and empty) were fumigated. The practice is growing, so that figures for 1932, will be larger 10 to 25 per cent.

Except for the destruction of rats on ships, hardly any direct public health purpose is involved in fumigation. It is employed almost exclusively to destroy vermin that constitute an economic loss; largely, this is the destruction of various insects infesting foods.

Processes Used

There are two principal processes; fumigation at atmospheric pressure and in a vacuum chamber. The vacuum process insures penetration of the fumigant into practically any package in the apparatus; the treated material may absorb as much as 80 per cent. or 90 per cent. of the gas. When at atmospheric pressure, much smaller proportions are taken up, while penetration into different types of materials varies greatly and requires much longer time.

A number of fumigants are used at present, but only a few to any considerable extent, these being hydrocyanic acid, sulfur dioxide, carbon bisulfide, ethylene oxide, ethylene dichloride, and chloropicrin. All of these are gases at ordinary temperatures or are converted to gases by evaporation; all are poisonous, in some degree, to all forms of animal life; all are absorbed to some extent by the materials fumigated. Continued aeration will remove the greater part of the absorbed gases, but there is considerable variation as to the time required. The varying toxicity and speed of action is reflected in the varying concentrations and periods of exposure employed. In commercial practice, these factors tend to balance one another, the more toxic and quickly acting materials being used in smaller amounts and for shorter periods.

The one fumigation hazard peculiar to the treatment of foodstuffs is this absorption of gas. This has been known for years, but the subsequent effect on consumers has never been completely and authoritatively determined. While hydrocyanic acid, because of its high toxicity, naturally has attracted attention, other fumigants have not been so closely studied. The thought has appeared that if HCN may be safely used, other materials of lesser toxicity are harmless. This may not be true; other gases must be used in heavier concentrations, and their mechanism of poisoning is different.

Absorption of fumigants depends on a number of factors: the process, concentration, exposure, temperature, and moisture. Fats absorb larger amounts of those that are fat solvents. Porosity increases the speed of absorption. All of these also effect the rate of subsequent dissipation. Three things may happen to gas absorbed in foodstuffs: the gas may be retained in original form; it may be given off when the food is removed into fresh air; or it may become chemically combined with the ingredients of the food. As regards the first and second possibility, the status at any one moment is a matter of time. When fumigated foods are removed into the open air, the absorbed material immediately starts to pass into the air and eventually all that is in a free state will be so dissipated. While it has been noted in some cases that the fumigant combines with certain foods, hydrocyanic acid with levulose and ethylene oxide with water being demonstrated instances, the data at hand indicate that in practice this occurs only to a quite limited extent.

Unnoticed Hazards

The fumigant absorbed in foodstuffs may become a hazard in two ways. If stored in a closed space, evolution of the absorbed gas may produce a lethal or toxic concentration in the air of the storage chamber. This is a danger that is often given entirely too little thought, though it is far more real than the other hazard, that is, poisoning of consumers by retained gas. So far as published data go, there have been a number of fatalities from released gas, but there is no instance on record, of which the writer is aware, of any human being ever having been killed by eating fumigated food.

The absence from the literature of any report of death from consuming fumigated foods is remarkable and deserves particular emphasis. Quite a number of writers have given their attention to this subject, so that there has been no lack of search. The only reasonable conclusion is that no such deaths have occurred.

The presence of any considerable amount of absorbed fumigant can be detected by smell or taste, particularly the former. Trained fumigators find the sense of smell a reliable test, the practical experience of years bearing out the belief that when the odor of a fumigant has disappeared, the amount still retained is small.

The effect of hydrocyanic acid fumigation on foodstuffs was recently investigated and the data at hand reviewed by Monier-Williams[1] for the International Commission on Fumigation of Ships, sponsored by the League of Nations and the Office International d'Hygiene Publique.

Permissible Content in Foods

Largely because of the lack of data as to actual poisoning by absorbed HCN, Monier-Williams was quite conservative in drawing conclusions as to permissible content in foods. The Commission, in its report[2], was equally conservative, stating that the content of 20 parts per million HCN in food probably does not affect the health of the consumer. Considerably larger amounts than this have undoubtedly been consumed on numerous occasions without any effect whatever being noted on the consumer. For many years, it has been a common practice for fumigators to eat food immediately after fumigation; in fact, on ships, the writer has known fumigators (protected by gas masks) to go into compartments under fumigation and bring out food to be immediately consumed. In such cases, however, the concentration of gas used was not high—seldom over .2 volume per cent. of HCN. However, Moore[3] reports instances of fumigators consuming candies and nutmeats fumigated in a much higher HCN concentration—1 volume per cent.—within a few minutes of their removal from the fumigation chamber, without any signs of poisoning being noted. The writer has frequently eaten fumigated foods a few minutes after their removal, and has noted in the dry foods such as crackers no taste of HCN, but sometimes in grapes and apples the gas could be detected, presumably more through odor than taste. Fruits after peeling showed no signs of gas.

The relatively few animal tests have all been negative. Some years ago, the Public Health Service[4] fumigated bread and milk with gas concentrations up to .4 volume per cent., and fed it to mice—in some instances immediately after fumigation, and in others after a period of airing. In no cases were the mice affected, but in some instances when placed in jars with unaired fumigated food, they were killed by breathing the gas evolved therefrom. Swanson and Working[5] cite experiments wherein fumigated grain was fed to chickens. In nearly all of these cases, the grain contained about 20 parts HCN per million and was fed over periods of several days to two or three weeks. In no instance could any poisonous effect be noted. Buttenberg and Weiss[6] fed fumigated foods containing from 10 to 30 parts HCN per million to men in place of their regular diet, over periods up to one week, without noticeable effect. Lutrario[7] fed fumigated food containing 20 to 100 parts HCN per million to dogs, in approximately 500 gram portions, without effect.

As against this data we have a considerable volume of chemical determinations which have shown that the amount of HCN absorbed varies very considerably. In some instances, immediately after fumigation as much as 2,000 parts HCN per million were found. While this was exceptional, it has not been unusual to find as much as 100 or even 200 parts HCN per million. More than 100 parts per million appear practically only in foods fumigated by the vacuum process, or, at atmospheric pressure, with concentration of the gas greater than the usual limit of 1 volume per cent. In the former case, it is usual commercial practice to air-wash, in the vacuum chamber, goods designed for shipment within a short period. When fumigated foods are cooked prior, retained hydrocyanic acid is reduced to a negligible figure, the high temperature of cooking causing it to be rapidly dissipated.

The fatal dose of hydrocyanic acid is generally placed at 60 milligrams. It will be seen, therefore, that when a food contains 100 parts per million, it would be necessary to consume 600 grams of it to ingest a fatal dose of the poison. This amount is a rather large portion of any one food.

Action on Body Tissues

Hydrocyanic acid inhibits the consumption of oxygen by the tissue cells. The poison is in part removed by conversion in the body into less toxic substances and in part by elimination, most rapidly through the lungs. Its inhibitory action on oxygen consumption depends largely on the concentration present, so that toxic action is measured by the balance between the rates of absorption on one side and of chemical change and elimination on the other. It will be appreciated, therefore, that poisoning by way of the stomach is dependent more on the rate of absorption than on the total amount of HCN ingested. An amount poisonous when taken in concentrated form might be totally innocuous when mixed with a large quantity of food. Furthermore, if the food contains sugars, a still larger amount of HCN may be taken since sugars eaten with or shortly before consumption of HCN definitely reduce its poisoning effect.

During the past few years, ethylene oxide has come into considerable favor as a fumigant for foodstuffs. Being necessarily used in much heavier concentration than HCN, more of it is absorbed, but this increase is balanced by its much lower toxicity. Ethylene oxide is stated to have a narcotic action. It is locally irritant to the stomach and lungs, and probably to other tissues. Furthermore, in the presence of water it forms, at ordinary temperatures, a limited amount of ethylene glycol, which in the body is in part oxidized to oxalic acid, a well-known poison.

As in the case of HCN, however, it has been clearly shown that the minimum poisonous dose is in excess of the amount retained in foods, either as the unchanged gas or as ethylene glycol. In the first place, the retention of about 5,000 parts per million would be necessary to include a poisonous dose in a 500-gram portion of food, while to be poisoned by the ethylene glycol, that might be formed, a man, on the basis of any reasonable computation[8], would have to consume some hundred pounds of the fumigated food at one sitting. According to Schwartz and Decker[9], 90 per cent. of absorbed ethylene oxide is removed by twenty-four hours' aeration.

What has been stated with regard to hydrocyanic acid and ethylene oxide applies, in general, to the absorption and subsequent health menace of other fumigating gases. Space does not permit a descriptive account of all of the fumigants mentioned, but it may be stated for all fumigants now in general use that there exists at present no specific data to support any contention that these fumigant gases absorbed in fumigated materials are a menace to consumers. While the volume of fumigation of foodstuffs is high, report of morbidity or mortality from the consumption of fumigated foods is to date zero.

In view of the statement just made, it is well here to sound a warning. Chemical progress is constantly supplying us with new compounds, and it is to be expected that new fumigants will appear from time to time. What changes they may produce when used to fumigate foodstuffs can be determined in each instance only by careful investigation, which should always precede their introduction into general use.

References

1. Monier-Williams, G. W. The effect on foods of fumigation with hydrogen cyanide. Reports on Public Health and Medical Subjects, No. 60, Ministry of Health, Whitehall, London.
2. Commission on Fumigation of Ships, Report, Quarterly Bulletin of the Health Organization of the League of Nations, June, 1932.
3. Moore, William. Report on the uses of hydrocyanic acid in fumigation of foodstuffs. American Cyanamid Company, New York.
4. Absorption of HCN by foodstuffs. U. S. Public Health Reports, July 2, 1920.
5. Swanson, C. O., and Working, E. B. The Miller's Review, August, 1926.
6. Buttenberg, P., and Weiss, H. Effect of fumigation with hydrocyanic acid gas upon food on ships and in warehouses. Zeitschr. f. Untersuch d. Nahrungs u. Genusmittel, xlviii, 1924, p. 104. (Bull. Office Int. d'Hyg. Pub., 1925, p. 1035).
7. Lutrario, A. Experiments with hydrocyanic acid. Bulletin, Office International d'Hygiene Publique, 1921, p. 367.
8. Hanzlik, P. J., Seidenfeld, M. A., and Johnson, C. C. General properties, irritant and toxic actions of ethylene glycol. Journal of Pharmacology and Experimental Therapeutics, vol. xli, no. 4, April, 1931, p. 387.
9. Schwartz, L., and Deckert, W. The hygienic evaluation of T-gas (ethylene oxide) as a means of fighting pests. Zeitschr. f. Desinfekt. u. Gesundheitwesen, July, 1930, Hamburg.

Company Booklets

Federazione Nazionale Fascista Dell' Industria, Rome. Through the courtesy of the publicity dept. of the Montecatini, a copy of the annual report of Italy's chemical industry.

Glyco Products, Bush Terminal Bldg. 5, Brooklyn. A wealth of important information on emulsions, waxes and resins gathered together into one booklet.

Grasselli Chemical, Cleveland. A new leaflet describes the specifications of a number of Grasselli C. P. products. Also, "Silicate of Soda—In Its Various Forms" is a new booklet of considerable interest to silicate users.

Hercules Powder, Wilmington. "Pale Wood Rosins" describes the physical and chemical properties of Hercules' special rosin grades.

Meterjol Products, Empire State Bldg., N. Y. City. A leaflet lists several new detergent products.

Monsanto Chemical, St. Louis. A revised list of the chemicals produced by Monsanto.

National Association of Glue Manufacturers. "The Story of Animal Glue" is a very instructive booklet on a subject seldom given much space in our technical publications. Of interest to users of all types of glue.

Onyx Oil & Chemical, Jersey City, N. J. Textile executives will find much of interest in a new booklet on the glyceryl sulfates and aliphatic ester sulfate.

Philadelphia Quartz, Philadelphia. "Silicates of Soda" is a very complete resume of silicates, uses, grades, containers, etc. November "P's & Q's" is devoted to an interesting editorial on silicates in nature and in the arts.

Roessler & Hasslacher Chemical, Empire State Bldg., N. Y. City. The latest quarterly revised price list contains several important price changes.

Rolls Chemical, Ellicott Square Bldg., Buffalo. The latest "Retorts" is a particularly good issue of this interesting customers' house-organ.

Rossville Commercial Alcohol Co., Lawrenceburg, Ind. "Rossville Alcohol Talks" is devoted to the continuation of the story of alcohol in the paper industry.

R. T. Vanderbilt Co., 230 Park ave., N. Y. City. The Sept.-Oct., issue of "The Vanderbilt News" features Kalite as an activator of vulcanization. Every rubber chemist and executive should request being placed on the mailing list.

Standard Silicate, Frick Bldg., Pittsburgh. "Cleaner Clothes" is a concise, but thorough textbook for the laundry operator working with sodium metasilicate.

Equipment Bulletins

American Hard Rubber Co., 11 Mercer st., N. Y. City. A new catalogue of "Ace Hard Rubber Products for Industrial Purposes." Gives a wealth of technical data.

Linde Air Products, Carbide and Carbon Bldg., N. Y. City. "Oxweld No. 25M.—Bronze Patented Welding Rod" describes the physical and welding characteristics of this new bronze welding rod.

The Parker Appliance Co., 10320 Berea Rd., Cleveland. Catalogue 34 describes "Innerseal Fittings" a new product for commercial plumbing of particular importance because it solves the "joint problem."

Raymond Bros., Impact Pulverizer Co., 1302 N. Branch st., Chicago. Booklet effectively describing new Raymond process—from wet solids to dry powders in one operation (kiln mill drying).

Surface Combustion Corp., Toledo. New booklet describing SC industrial furnace and burner equipment. Profusely illustrated.

New Products and Processes

Rayon New Drying-Oil Size

Complaints are often received of oxidation of the size in rayons when the sized goods have been in storage and the linseed oil size used was prepared in the customary way from straight linseed oil. By a new process this susceptibility to oxidation is lowered by partly sulfonating the linseed oil used in the size preparation in the presence of other non-drying oils. It is further stated that linseed oil and other drying oil sizes prepared in this manner act as assistants in the creping of any highly twisted yarns on which they are utilized.

To prepare a size of this kind, mix thoroughly 100 parts of olive oil and 20 parts of sulfuric acid of 66 deg. Bé. at a temperature of 10 deg. C., the mixture being then added to a similar one, but with linseed oil substituted for the olive oil. The whole mixture is then embodied with 100 parts of linseed oil and 20 parts of sulfuric acid of 66 deg. Be., but for this stage the temperature is gradually raised to 35 deg. or 40 deg. C. The resulting sulfonated product is then washed with water and neutralized with dilute alkali, in which state it may be used either alone or in combination with other media. Two specimen sizes for rayon yarn are:

Size 1

Sulfonated oil (as above)	40 parts
Glue	6 "
Gum Arabic	4 "
Water	50 "

Size 2

Sulfonated oil (as above)	30 parts
Wax	2 "
Soap	7 "
Glue	6 "
Water	55 "

Non-caking Superphosphate

In the decomposition of raw phosphates with sulfuric acid, or with another acid with simultaneous or subsequent addition of the sulfuric acid radicle, the reaction mass is subjected to such a solution vapor pressure that the calcium sulfate present as semi-hydrate and/or anhydrite becomes sufficiently stable to permit washing or treatment with water, diluted phosphoric acid, etc., without substantial change of the contents of water of hydration. The heating may be carried out in the presence of added phosphoric acid or previously produced reaction mass containing it, and the required temperature may be ascertained from the relation $2p + t =$ at least 186, where p is the percentage of P_2O_5 by weight present, and t the temperature necessary. By having a sufficient concentration of phosphoric acid, the decomposition and stabilization may be carried out in an open vessel—for instance, the phosphoric acid added may contain at least 36 per cent. by weight of P_2O_5, and at least as much be added as is formed in the decomposition. The addition may be made to the raw phosphate and reaction be effected therewith prior to addition of sulfuric acid. In effecting decomposition with sulfuric acid, excess acid may first be used at the temperature of stabilization, and then further raw phosphate be added; or the excess sulfuric acid may be added to reaction mixture already produced, and the temperature be then raised to that necessary prior to addition of the further raw phosphate required. By applying the process to the direct formation of superphosphate, hardening during storage is prevented or retarded.

Concentrated Nitric Acid

Striking advantages over the earlier methods for the production of synthetic nitric acid in concentrated form are possessed by a new process based upon the exothermic reaction between nitrogen tetroxide, water and oxygen at moderate temperatures and pressures. According to reports the researches described before the national Italian Chemical Congress have shown the reaction is considerably accelerated by moderate increase in temperature, the reaction period of 12 hours at 15° C. and 50 atmospheres being reduced to one of four hours on increasing the temperature to 70° C. In actual practice water is replaced by dilute nitric acid such as is obtained during absorption of gases in the synthetic ammonia process.

Technical difficulties hitherto bound up with the production of liquid nitrogen tetroxide have also been overcome. Great inconveniences attended the process formerly employed at Bodio (Italy), involving isolation of the tetroxide in liquid form by cooling to—50° C., and a fatal explosion led to its abandonment, but it has now been found possible to obtain the nitrogen oxide in liquid form by compressing the gas to eight atmospheres at a temperature of—10° C.

Concentrated (98 per cent.) nitric acid can be obtained by the new Fauser process with remarkable economy, for the necessary oxygen can usually be obtained as a by-product in such operations as the manufacture of nitrogen from liquid air or the production of hydrogen by electrolysis of water. Heating plant is superfluous, the exorthermic character of the reaction sufficing to heat up the mixture to the moderate temperature at which the process is worked. The energy required to compress the gases is about 12 kilowatt hours per ton of concentrated nitric acid, so that the cost of the concentrated acid depends in the main upon the cost of production of liquid nitrogen tetroxide.

Phosphorus Oxychloride

Phosphorus oxychloride, a material of growing importance in the plastics industry, can be obtained by reaction between the elements, or by the action of chlorine on phosphates as well as by the reaction between phosphorus pentoxide and phosphorus pentachloride. The latter process (originally introduced by Thorpe and Gerhard) has now been adopted on the semi-large scale but in a somewhat modified form by the Leningrad Institute of Applied Chemistry, and involves the chlorination of a mixture of phosphorus pentoxide and trichloride in accordance with the reaction:—

$$P_2O_5 + 3PCl_3 + 3Cl_2 = 5\ POCL_3$$

From an account of the process given in a foreign paper, the trichloride and pentoxide are first separately produced by chlorination and oxidation of heated phosphorus, the mixture being subsequently chlorinated in a slowly rotating mixer, and the oxychloride finally isolated by distillation. This modification of the Thorpe-Gerhard process permits of the employment of a lower temperature with consequent reduction in the violence of the reaction.

Tanning Materials

Products suitable for tanning are prepared by causing sulfite cellulose lye, phenols, cresols, and natural tanning substances to react with enzymes of the class of desmolases (phenolases, peroxydases, dehydrases) and with substances yielding oxygen, e.g., hydrogen peroxide, perborates, etc. The substances so obtained may be further treated with halogens. The tanning substances may be used for partial tanning prior to treatment with chrome liquors. According to examples, (1) sulfite-cellulose liquor, and guaiacol, p-cresol or pryrocatechol are mixed with hydrogen peroxide and peroxydase solution; (2) pine bark extract or sulfite-cellulose liquor are treated with hydrogen peroxide and peroxydase and the product is treated with bromine.

Chemical Facts and Figures

Government Competition

Rep. Shannon (Wis.) and his House Committee, appointed last June (H. R. 214) to investigate government competition with private business, are finding chemical industry able and willing to supply numerous outstanding examples.

National Association of Manufacturers, adopting the slogan "Get the government out of competition with business," has been particularly active, (*Chemical Markets*, Oct. p, 338) and on Sept. 20 executives, including representatives of the oil, paint and varnish, lead, chemical and fertilizer industries, appeared before Rep. Shannon and Committee, lead by Judge James G. Emery, counsel for the National Association of Manufacturers.

M.C.A. Joins Fight

Within the past month the Manufacturing Chemists' Association and the Association of Consulting Chemists and Chemical Engineers have joined the fight, filing lengthy briefs with the Committee. Both attack unwarrented research by government departments. This has long been a sore point with the industry, but up to the present time, opposition to such work at government expense has largely been fought because of the tremendous duplication in the several departments and bureaus. Now with private enterprise seeking every source of revenue, chemists and engineers engaged in research and consulting practice are joining hands with manufacturers to put an end to such unnecessary competition.

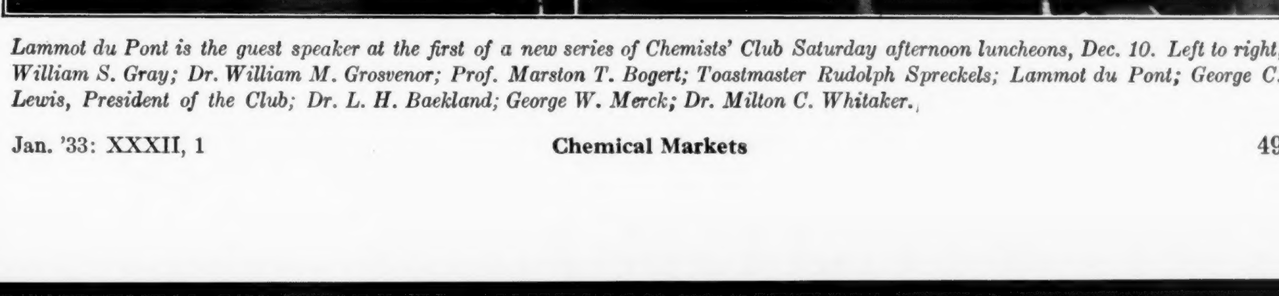
Going directly to the root of the trouble and not mincing words, Warren D. Watson, M. C. A. secretary, states in his letter to the Committee:

"Much of the industrial research done by the government has been initiated by industries, associations, or individual companies. This has, however, grown beyond the original intent or desired objective. This growth is the natural result of the zeal of government investigators and their administrative superiors. These government employees should not be criticized for this enthusiasm. The undesirable results are, however, none the less important. Furthermore, mere administrative correction is apparently not adequate to maintain effective limitation on this growth of research.

"Outstanding Evils"

"Some of the outstanding evils which result from unwarranted expansion of industrial research are:

1. The development from research into actual manufacture of products sold by the government.
2. The doing of such research by government agencies as actually interferes with the research of industrial companies and prevents the logical development of new enterprises under proper commercial auspices.
3. The retarding of industrial research by industrial groups in cooperative effort outside the government because of the activity within the government bureaus. The objective of the government's technical workers should not compete with or retard outside research.
4. Patents resulting from government investigation are often taken out with the object of dedicating them to the public. Such patents preventing any exclusive development by industry on projects where large additional development cost is necessary actually retard industrial development rather than aid it. The result, therefore, may be directly the opposite of that sought by the government workers.
5. Patentable invention made by government workers frequently results in patents owned by the individual government workers who then seek to exploit their inventions for their own private gain. The result of this is that the public pays not alone for having the research done but also pays to the government investigators a royalty which must be included as one of the costs of the goods or appliances made under the patents. When the government itself is a purchaser, there is usaully no royalty charged by the manufacturer although in the case of several naval and military inventions, officers have collected royalties on their inventions even though these inventions apparently resulted directly from their official employment in the military services. Such privately owned patents resulting from government investigation constitute one of the most serious evils that requires correction.
6. As a part of industrial research the technical specialists of the government become widely acquainted with industrial and trade practice and as a consequence are frequently consulted by industry. Working in this fashion they have become direct competitors of professional consultants and deprive them of a legitimate part of their professional business. Incident to consultation regarding researches or in their free consulting service to industry, government investigators often reveal trade secrets given them in confidence to the competitors of the company from which information has been obtained. With possibly few exceptions this improper revealing of trade secrets undoubtedly is done wholly without intention and often without the realization on the part of the government worker as to what he has done. The consequences are, nevertheless, extremely serious."



Lammot du Pont is the guest speaker at the first of a new series of Chemists' Club Saturday afternoon luncheons, Dec. 10. Left to right, William S. Gray; Dr. William M. Grosvenor; Prof. Marston T. Bogert; Toastmaster Rudolph Spreckels; Lammot du Pont; George C. Lewis, President of the Club; Dr. L. H. Baekland; George W. Merck; Dr. Milton C. Whitaker.

Corrective Suggestions

Not content with pointing out evils, Secretary Watson has laid before the Committee definite proposals to end this activity. He points out that merely to define by law the lengths to which federal industrial research may go is not sufficient; that curtailment by limitation of funds for such investigations is more effective. He urges that appropriations for industrial research be reviewed to determine whether they involve a strictly government function, such as safety, or health, or the national defense, and that every head of a department should be required in asking for appropriations to make specific re-demonstration of the necessity for appropriation, of their fundamental nature, and of their being not competitive with industry. In addition, the M. C. A. suggests that any extension of research to the point of actual manufacture of goods for sale be forbidden; and such manufacture, even for government uses, should have the specific authorization of the President or of Congress. The patent situation is also touched upon, and the conducting of free technical consulting services is attacked.

Specific Examples

Brief of the Consulting Chemists and Chemical Engineers, filed by Paul Mahler, secretary, is largely devoted to specific instances where government departments have entered into competition with private practice. The general policy of the Bureau of Standards with regard to testing is specificly condemned. The practice of permitting government workers to take out patents in their own name also comes in for severe criticism.

This question of government competition will probably not receive much attention from Congress at the present short session. But the issue will become important in the long session starting March 4. Business is making preparations to force upon the members of both houses a realization that in the interests of government economy and because of the existing business stringency the ever-increasing government interference with private business must be stopped and this work turned back to private enterprise.

Important Patent Decisions

Decision upholding validity of patent for the production of butyl-alcohol (butanol) and acetone, controlled by Guaranty Trust of New York, Sutacet Corp. and Commercial Solvents, was handed down by the U. S. Circuit Court of Appeals sitting in Philadelphia Dec. 10.

It was rendered in an appeal by Union Solvents, which was sued for infringements of the patent, known as the Weizmann invention.

U. S. District Court of Delaware ordered an injunction against Union Solvents and also directed it to pay damages and profits to the patent owning companies. The Circuit Court sustains that ruling and dismisses the appeal of the Union Co.

The Guaranty Co. and the Butacet Corp. are the owners of the patent rights and Commercial Solvents has the exclusive license to manufacture products under the patent in this country.

Union Solvents has, as yet, made no announcement of whether or not it intends to carry the suit to the Supreme Court. The litigation has been watched with a great deal of interest, not only by consumers of butanol, but by the industry at large.

COMING EVENTS

American Ceramic Society, Pittsburg, Feb. 12-17.

Technical Association of the Pulp and Paper Industry, Hotel Pennsylvania, New York, Feb. 13-16.

American Chemical Society, Spring Meeting, Washington, March 26-April 2.

The Electrochemical Society, Montreal, May 11-13.

American Society for Testing Materials, Chicago, Hotel Stevens, June 26-30.

American Electroplaters' Society, Chicago, Congress Hotel, June 27-30.

Exposition of Chemical Industries, Grand Central Palace, N. Y. City, Dec. 4-9.

American Society of Mechanical Engineers, N. Y. City, Dec. 4-9.

Local-N. Y. City*

Jan. 13—A. I. C.

Feb. 3—A. I. C.

***Chemist Club.**

Du Pont to Appeal

An appeal to the U. S. Circuit Court of Appeals has been taken by du Pont from the decision of the Federal District Court in Brooklyn invalidating the Flaherty patent on low-viscosity nitrocellulose lacquers, in the action charging Glidden Company with infringement. It is the general understanding that both parties in the several suits of this nature contemplate carrying the matter to the Supreme Court for final adjudication.

Trial of the action of du Pont against the Jones-Dabney Co., was begun in the Federal District Court in Wilmington, Dec. 12. This action has the same basis as the Glidden case. Counsel for du Pont petitioned for continuance of the Jones-Dabney procedure and also asked that the suit be dismissed without adjudication. Counsel for Jones-Dabney opposed these motions, and Judge Nields denied them.

Corn Products Victor

In Chicago U. S. Circuit Court of Appeals handed down a decision in the Penick & Ford-Corn Products Refining patent litigation which affirmed in part and reversed in part the decision of the lower court. Its decision upheld the District Court in the dismissal of the counterclaim, but reversed it by finding no infringement of the Widmer patent. With reference to the latter patent, the Court said: "The patent is for a 'series of steps' and the evidence, in our opinion, establishes that the defendant does not use 'one' of those, to wit: the sterilization of the gluten water after use and before reuse.

The case originally arose when Penick & Ford charged infringement by Corn Products of the Widmer patent for the manufacture of starch. Corn Products by counterclaim charged infringement of the McCoy patent for a closed wet starch system.

District Court found infringement of nine claims of the Widmer patent and dismissed the counterclaim on the issue of validity. Corn Products appealed the decision to the Circuit Court of Appeals.

Obituaries

Samuel Gelston King

Samuel Gelston King, 75, president, E. & F. King & Co., Boston chemical distributors, died unexpectedly at his home in the Back Bay section on Dec. 21. Mr. King was a former president of the Paint and Oil Club of New England. His father was the founder of the business with which the son was connected for more than a half-century. Mr. King was a director of the Old Colony Gas Co., Braintree, Mass., and of several other corporations. He was a member of the Country, the Union, the Exchange, and the Beverly Yacht Clubs. Surviving are his two sons, Franklin King, Brookline, Mass., and Gelston T. King, Sherborn, Mass., and a daughter, Mrs. Edward M. Farnsworth, jr., Chestnut Hill, Mass.

Andrew Thompson

Andrew Thompson, 55, vice-president, Titanium Alloy and vice-president, Titanium Pigment, died Dec. 15 of a heart attack. Mr. Thompson's uncle, James McNaughton, was a pioneer in this country in the development and smelting of titaniferous ores and upon his death in 1906 the business passed to his two nephews.

Mrs. Edith Barton Riker, 72, widow of John J. Riker, former president of J. L. & D. S. Riker, (now Jos. Turner & Co.) died Dec. 21. She survived her husband by only four months, his death occurring Aug. 4 at his hunting lodge at Moose

Lake, N. Y. Mrs. Riker's will was admitted to probate Dec. 28. Her residuary estate is believed to exceed $1,000,000.

Institutions named are the Church of the Epiphany, N. Y. City, of which she was a member; Bethlehem Day Nursery, of which she was treasurer; N. Y. Eye and Ear Infirmary, and the Roosevelt Hospital. Each receives one-fifth of the residuary estate.

Thomas F. Burgess, 69, vice-president National Sulphur and a former secretary of General Chemical previous to its inclusion in the Allied group, died suddenly at his home in Scarsdale, N. Y. on Dec. 28.

Edward Mallinckrodt 3rd, 21, son of Edward Mallinckrodt, Jr., chairman of the board, Mallinckrodt Chemical, was drowned in Boston harbor Dec. 29 when the plane he was piloting fell into the water. He was a grandson of the founder of the business.

Muscle Shoals

President-elect Roosevelt announced, Jan. 1, that he would make a personal inspection of the country's prize "white elephant"—the $150,000,000 power and nitrate plant at Muscle Shoals. While no specific date was mentioned in the announcement, it is believed that the trip will be made Jan. 21. He will be accompanied by Senators Norris of Nebraska, Bankhead and Black of Alabama and Hull and McKellar of Tennessee; Representative Hill of Alabama; Judge McNinch of North Carolina, member of the Federal Power Commission, and several power experts. Senator Norris, Progressive Republican, who supported Mr. Roosevelt for election, has been the principal protagonist for government operation of the power plant at Muscle Shoals. Nebraskan has been insistent that the government operate the plant, construct transmission lines and sell cheap power direct to consumers. He has been willing to have the chemical plant leased for the manufacture of nitrates, on the theory that the farmers would receive the benefit through a decrease in the price of fertilizers. Bills for government operation of the Muscle Shoals plant, introduced by Senator Norris, have passed Congress twice, but were vetoed by Presidents Coolidge and Hoover.

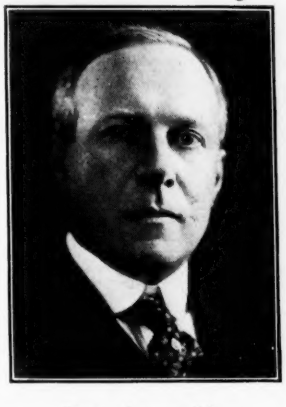
Announcement of Roosevelt's proposed visit to Muscle Shoals before his inauguration has been interpreted in fertilizer circles as presaging an early attempt to bring the question before Congress.

Possibility that natural gas from the oil-fields of India and Burma may be a source of supply of helium is to be investigated shortly, and the Government has made a small grant from its research fund for the purpose.

Association News

Synthetic Organic Meets

August Merz was re-elected president, Synthetic Organic Chemical Manufacturers' Association on Dec. 15. Mr. Merz apparently has a life-long "job" as pres-



Pres. August Merz has a life-long "job"

ident, for his re-election marks sixth or seventh time he has been chosen. Others re-elected with Mr. Merz were vice-presidents, E. H. Killheffer, du Pont; and F. G. Zinsser, Zinsser & Co. Members of the board named were: E. A. Barnett, John Campbell & Co.; G. Lee Camp, Monsanto vice-president and sales director; R. E. Dorland, N. Y. Dow manager; and A. L. Van Ameringen, of Van Ameringen-Haebler, Inc. Association had as its guest speakers Francis P. Garvan, president, Chemical Foundation, and the U. S. Institute for Textile Research; and C. C. Concannon, chief of the chemical division, Bureau of Foreign and Domestic Commerce.

Reese Honored

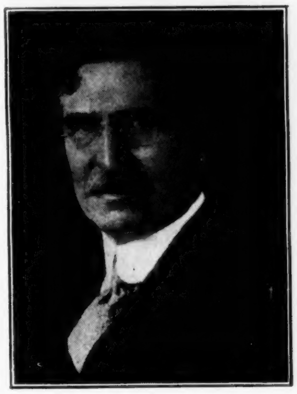
Du Pont's retired chemical director, Dr. Charles L. Reese, has been elected A. C. S. president for 1934. Prof. Arthur B. Lamb, Harvard, became president of the Society Jan. 1, and will serve throughout 1933, succeeding Dr. L. V. Redman, Bakelite vice-president. Prof. Lamb served as president-elect during 1932. Society elected as district directors for 1933 Prof. James F. Norris of M. I. T., and Dean Frank C. Whitmore of Penn. State. Dr. M. C. Whitaker, Cyanamid vice-president, was chosen a director-at-large. Councilors-at-large named: Prof. James B. Conant, 1932 Nichols medalist and Harvard professor; Dr. John Johnston, U. S. Steel director of research; Prof. Charles A. Kraus, Brown; and Dr. David Wesson.

Dr. Reese retired in 1931 as du Pont chemical director, having served that company with distinction in various capacities since 1902—as a director of the corporation and especially during the difficult period of the War and the great expansion in the company's interests at that time and immediately thereafter.

He was graduated from the University of Virginia and took his doctor's degree at Heidelberg. Honorary degrees have been conferred upon him by several institutions. He taught for some time at Johns Hopkins, at Wake Forest College, and the South Carolina Military Academy. Dr. Reese at one time was chief chemist of N. J. Zinc. He has been president of the A. I. Ch. E. and of the M. C. A., an associate member of the Naval Consulting Board, member of the Board of Trustees of International Critical Tables, and has served as an officer of two divisions of the National Research Council.

Eastern N. Y. Section, A. C. S. celebrated its 25th anniversary Dec. 16 at Union College, Schenectady, N. Y., with a reunion of surviving charter members, among whom is G. E. research director, Dr. Willis R. Whitney. Event also commemorated achievements of the late Prof. Charles F. Chandler, Columbia, pioneer in industrial chemistry, who in 1857 began at Union a teaching career of 54 years.

Prof. Marston T. Bogert of Columbia, who as president of the A. C. S. addressed Section's first meeting, Dec. 16, 1907, was the principal speaker. Prof. Bogert in his address reviewed career of Prof. Chandler, called the "Father of the A. C. S." Prof. Chandler went to Union as a "janitor," receiving a salary of $400 a year, since there was no appropriation



In accordance with its by-laws the A. C. S. has designated a president-elect one year in advance of his taking office. For leadership in 1934 the Association has turned to one of its most popular and distinguished members, Dr. Charles L. Reese (left). Prof. A. B. Lamb, right, is now president, succeeding Dr. L. V. Redman.

in the college budget for an assistant in chemistry. In 1864 Prof. Chandler was called to Columbia College, where he founded the School of Mines and became head of the Dept. of Chemistry, a post he retained until his retirement in 1911. Prof. Chandler died in 1925 at the age of 90.

La Mer Succeeds Landis

Prof. Victor Kuhn La Mer, Columbia, has been elected chairman, N. Y. Section, A. C. S. for 1933, succeeding Cyanamid's vice-president, Dr. Walter S. Landis.

J. M. Weiss, president, Weiss and Downs, Inc., was elected vice chairman of the Section, and Dr. David P. Morgan, Jr., Scudder, Stevens & Clarke, 111 Broadway, secretary-treasurer.

Disinfectant Makers Elect

Merck's Peter Dougan was elected president, National Association of Insecticide and Disinfectant Manufacturers, Inc., on Dec. 13 in final session and election of officers at the Hotel New Yorker. Mr. Dougan is widely known in the industry he represents and was formerly vice-president of the association. He succeeded as president Evans E. A. Stone of William Peterman, Inc., whose resignation was announced. S. H. Bell, Koppers Products was elected first vice-president.

"Pine Tree" Billy V. Van, "light opera" comedian and, in-between-times, soap manufacturer and salesman, performed before the drug and chemical section, N. Y. Board of Trade dinner Dec. 20 at the Astor.

Important Discovery

Chemical salesmen made an important discovery at the "induction into office luncheon" held at the Chemists' Club on Dec. 29. President Gogarty, can be serious as well as facetious. His suggestions that the Society give greater thought to increasing its membership and to helping members unemployed in finding positions, were received with hearty approval. In the evening, at the annual "Christmas Party" at the Park-Central, following a long established custom, reporters were divested of their pads and pencils as they entered. As a result, many a happy home will remain so for another year at least.

New Fumigation Committee

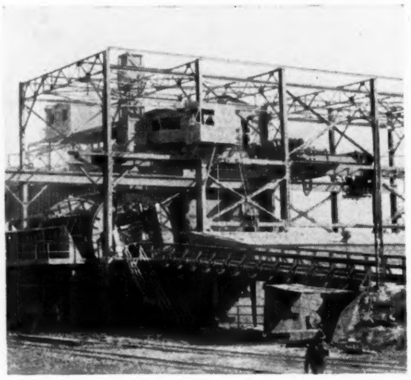
M. C. A.'s new fumigation committee includes I. L. Ressler, du Pont, chairman; W. S. Gavan, Cyanamid; H. Sydney Smith, Union Carbide; A. K. Scribner, Virginia Smelting, and A. W. Putnam, Dow Chemical.

Emergency Unemployment Relief Committee will finance staff of 100 men at Columbia University to aid technocracy group of engineers in extensive study.

Foreign

Cosach Dissolved!

Mr. Whelpley's eleventh hour attack on those seeking the termination of the Cosach apparently had little effect in stopping the course of events and on Jan. 2 the first official act of President Alesandri was to sign the decree ending the huge nitrate combine.



Will Cosach's end mean the abandonment of the Guggenheim Process? Primary crusher at the Maria Elena plant

"Liquidation" instead of "dissolution" so press dispatches from Santiago report, the Chilean government prefers to describe the Cosach finale. Holders of these securities here and abroad, viewing with ever-increasing alarm the course of events in Chile, are not likely to quibble over the niceties of words while Chile's $750,000,000 nitrate giant is done to death at the hands of Arturo Alesandri and his newly elected cohorts.

Liquidation has received final approval after prolonged negotiations between Finance Minister Gustavo Ross and directors of Cosach. It is reported that the liquidation program will be stretched over a two year period to adjust various complications created here and abroad.

Commission to Liquidate

Problem of winding up the business is entrusted to a commission to include three Cosach directors, its president, M. G. B. Whelpley, Vigal de la Fuente, general manager, and Senator Joaquin Irrarazaval, legal advisor. Chilean government, according to present plans, is expected to have one representative on the commission and the Supreme Court will nominate another. Talk centers around the formation of another company with a capitalization of about $180,000,000 and plans for the return of the nitrate fields to the government and the collection of an export tax.

The sudden turn in events in Chile is laid to the bitter and uncompromising opposition of northern groups towards the floating of a loan of $1,300,000 to be underwritten by U. S. and British bankers to cover the commercial operation of Cosach and secured by unshipped nitrate stocks. The opposing groups felt that such action would prolong Cosach's existence, although President Whelpley explained that the company faced bankruptcy unless facilities were granted to allow flotation of the contemplated loans abroad.

Better Volume

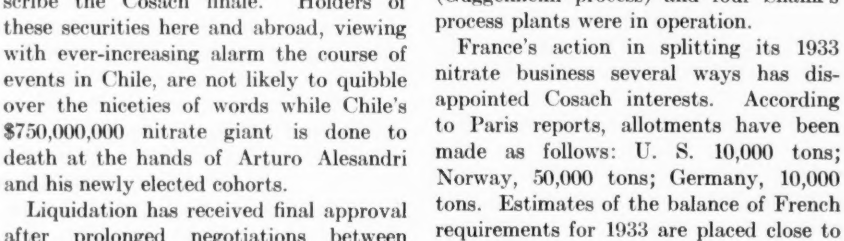
During the past month some improvement has been reported in nitrate shipments. On Dec. 28 it was announced that France was ordering 50,000 tons and on Dec. 29 Chile reported negotiations for the sale of 50,000 tons to Japan progressing favorably, although only 3,000 tons actually have been so far shipped. This call can have but little effect on the huge reserve stocks in Chile or on working conditions in the northern provinces. Late in November only the Maria Elena (Guggenheim process) and four Shank's process plants were in operation.

France's action in splitting its 1933 nitrate business several ways has disappointed Cosach interests. According to Paris reports, allotments have been made as follows: U. S. 10,000 tons; Norway, 50,000 tons; Germany, 10,000 tons. Estimates of the balance of French requirements for 1933 are placed close to 130,000 tons.

Whelpley's Statement

Apparently unwilling longer to stand by while Chilean politicians play football with the "nitrate situation" Mr. Whelpley Dec. 31 broke several months silence and issued a lengthy pronouncement in addition to the year-end financial statement.

He gave a review of the corporation's operations and explains cutting down production, general expenses and employes as necessitated by world conditions. Statement says the Guggenheims' financial support has been considerable in keeping the corporation from sinking in the storm of serious difficulties encountered.



Largest synthetic nitrogen plant in the world—Meresburg plant of the I. G. With a world's largest industry has now been driven to struggle

Defends Sales Policies

Mr. Whelpley argues that the sales policy, which has met so much criticism, was instituted in accordance with modern principles and existing conditions in the foreign markets, where the old Chilean sales system was obsolete. The Guggenheim process of nitrate extraction and refining, which is bitterly opposed by many he claims, has proved itself as an efficient and economical means of treating the lower-grade ores, where the old Shanks process certainly would fail.

The nitrate industry may be successfully developed he believes if reorganization schemes are appointed in a reasonable, practical spirit, with fair consideration of all interests. He says political considerations have compelled the company continually to give out technical information, of which advantage has been taken by foreign competitors, while the Chilean public has been unable to grasp the harm this has had on Chilean affairs and credit.

Mr. Whelpley demands more business-like procedure in the future in approaching the corporation's problems. Statement concludes:

"It is time for the so-called nitrate question to be liquidated once for all and the industry allowed to work in peace, permitting the management of the company to devote all of its attention to commercial problems without being continually hampered and attacked by successive unjust and unreasonable campaigns."

Nitrogen Figures

A good picture of the world-wide nitrogen situation is given in the recent report of the British Sulfate of Ammonia Federation in which the nitrogen producing capacity today is estimated about 140 per cent. greater than present demand and 100 per cent. in excess of the record consumption of 1929-1930. Says the report: "Notwithstanding, new synthetic nitrogen plants are still being planned and constructed in a number of countries." Further, the report goes on to state:

"During the year it is estimated that there was a decrease of 104,584 metric tons of nitrogen, or about 8.3 per cent. in the actual production. The production in Chile decreased by 80,000 tons, or about 32 per cent., and the output in other countries decreased by 60,584 tons, or four per cent.

"Total nitrogen producing capacity in the world at the present time is estimated to be about 3,400,000 tons, exclusive of Chile. The 'manufactured nitrogen' industry of the world thus operated at an average of about 42 per cent. of capacity.

"Total consumption decreased by 61,517 tons, or 3.75 per cent., following upon a decrease of 17 per cent. last year and increases for the years 1927-1928, 1928-1929, and 1929-1930 of 20 per cent., 14 per cent., and four per cent., respectively."

"World consumption of nitrogen in all forms during 1931-1932 amounted to 1,559,788 tons, of which 1,421,580 tons were manufactured nitrogen and 138,208 tons Chilean natural nitrate. World production amounted to 1,553,704 tons during 1931-1932, made up as follows: 'sulfate of ammonia, 785,591 tons; cyanamide, 134,104 tons; nitrate of lime, 79,190 tons; synthetic, 353,320 tons; by-product, 31,170 tons; Chilean nitrate, 170,000 tons.

"Total nitrogen consumption in America for the year under review is placed at 215,372 tons, as follows: Ammonium sulfate and ammonia for mixed fertilizers, 112,250 tons; Chilean nitrate, 16,147 tons; calcium cyanamide, 10,554 tons; other synthetic nitrogen fertilizers, 14,400 tons, and nitrogen products for industrial products, exclusive of Chilean, 62,021 tons.

"In individual countries, the largest tonnage increases in nitrogen consumption have been in Japan, Holland, France, Spain and the British Isles. The greatest decreases have been in the U. S., Germany, Java, and China."

German I. G. is bitterly attacked in a book "I. G. Germany, a State Within a State" by Helmut Wickel. (Verlag Der Buckerkreis Gmb. H., Berlin.)

Dyestuffs Act Renewed

British chemical circles generally, and in particular, producers and consumers of dyestuffs, have shown great interest in the proceedings before the committee reporting on the question of maintaining for another year the Dyestuffs (Import Regulations) Act of 1920. Consumers fought bitterly the extension of the Act for another year and filed a minority report. However, the Act was included in the expiring Laws Continuance Bill for a one year's operation. Government announced that while the Act would be continued for another year, in the meantime, a committee would be appointed to go into the question in minute detail so that definite data would be available before the question is again raised in 1933.

German Chemical Exports

German exports of chemicals have declined steadily in value since 1929 when they had a total value of 1,421,000,000 marks. Total value of these sales dropped to 1,230,000,000 marks in 1930 and, further, to 1,041,600,000 marks in 1931. During the first nine months of this year German chemical exports had a total value of 557,300,000 marks, equivalent to a twelve-month total of 743,000,000 marks. U. S. ranked first among foreign buyers of German chemicals.

Leading buyers of German chemicals in the first six months of 1932 were:—

	Marks
Nordic countries	34,300,000
France	32,200,000
Great Britain	24,500,000
United States	23,000,000
Latin America	22,800,000
Netherlands	21,100,000
Japan	20,800,000
Switzerland	19,600,000
British India	19,500,000
Czechoslovakia	18,000,000
China	16,700,000
Spain and Portugal	15,000,000

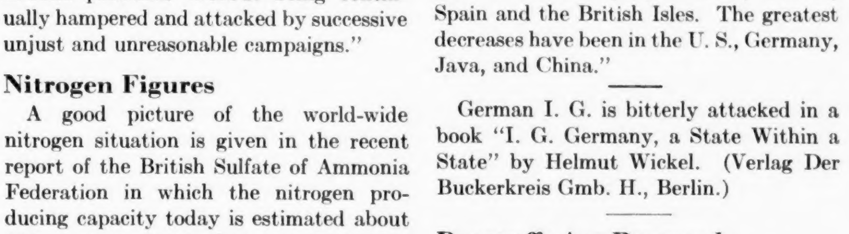
German exports of anilin, alizarin, and indigo dyes amounted to 20,642 metric tons, valued at 93,300,000 marks, in the first nine months of 1932, or at the rate of 27,600 tons and 125,000,000 marks for the entire calendar year 1932. This would compare with 43,700 tons and 175,000,000 marks in 1931 and 41,500 tons and 190,000,000 marks in 1930. These figures indicate that Germany exported 60 per cent. of its production in 1931 and may export a little better than 40 per cent. in 1932.

I. G. has taken on 4,000 additional employes within the past few months, according to a company announcement. This reflects in part the general stimulus to industrial activity resulting from the von Papen program, under which tax rebate anticipation warrants were given industrialists who increased employment. At the end of 1931 the company had 68,000 employes, as compared with 80,000 at the end of 1930.

Finis?

"*The Chemical News,*" which was founded in 1859 by late Sir William Crookes, has apparently ceased publication. Issue for Sept. 23 was the last weekly number of this periodical. Apparently re-arrangements have fallen through and the oldest English weekly chemical journal has come to an end.

Russian sulfuric acid plant at the Wokresswnske Chemical Combine is now producing 40,000 tons of acid annually. Plans call for eventual production of 280,000 tons of acid, 1,000,000 tons of superphosphate and 150,000 tons of phosphoric acid.



synthetic capacity at least 3,000,000 tons and consumption only 1,600,000 tons, Chile's not for supremacy but for its very existence.

There is a Santa Claus!

A white-whiskered, rotund gentleman, wearing a red suit trimmed with ermine, four days late but welcome as ever, arrived at the door-steps of several chemical companies on Dec. 29 bearing tax refunds from "Uncle Sam." National Aniline was the recipient of the largest single "Christmas Stocking" and after a little delay members of the treasurer's office finally "fished" out a check for $1,455,-693.62 Other companies receiving refunds and the amounts are as follows:

Allied Chemical and Dye Corporation, 61 Broadway	$299,907.45
American Smelting and Refining Company, 120 Broadway	2,435.39
Chipman Chemical Engineering Co., Inc., 136 Liberty St	2,941.33
National Aniline and Chemical Company, Inc., 40 Rector St	1,455,693.62
Sharp & Dohme, Inc., Philadelphia	1,484.15
Uniform Chemical Products, Inc., 30 Church St	100,997.54
American-Cyanamid Company, 535 5th av	2,559.63
American Solvents and Chemical corporation of Delaware, 122 West 30th St	5,142.29
Dif Corporation, South Av., Garwood, N. J	1,522.89
Nichols, William H. Jr., estate of, Central Hanover Bank and Trust Company and Francis Tilden Nichols, executors, 70 Broadway, Manhattan (estate)	....
General Carbonic Company, care Beekman, Bogue and Clark, 15 Broad St	1,343.99
West Disinfecting Company, 16 Barn St., Queens	2,157.38
Industrial Welded Alloys, Inc., 8 Lister Av., Newark	1,580.50
Maywood Chemical Works, 100 West Hunter St., Maywood, N. J.	1,835.18
McKesson & Robbins, Inc., Bridgeport	4,228.35
du Pont, Philip F., estate of, Fidelity-Philadelphia Trust Co., executor, 135 South Broad St., Philadelphia	21,005.15
Columbian Carbon Company, care Harry J. Gerrity, 1001 Hill Building, Washington, D. C	16,826.82
Aluminum Company of America, Pittsburgh	91,495.71
Columbia Chemical Company, Pittsburgh Plate Glass Company, transferee, Pittsburgh	29,744.63
Pittsburgh Plate Glass Company, Pittsburgh	662,290.86
du Pont, William, estate of, Delaware Trust Company, executor, Wilmington (estate)	304,526.48
Portsmouth By-Product Coke Company, Portsmouth, Ohio, $23,851.-22; Portsmouth By-Product Coke Company, care Stephen T. De La Mater, 1,705 De Sales St., N. W., Washington, D. C. $1,326.21	25,177.43

Disclosure?

Mystery surrounding Allied's reputed tremendous stock holdings may be cleared up shortly. First official breakdown may be published in company's next annual report if correspondence between company and N. Y. Stock Exchange results in such a decision.

Not only did the last report of the company carry single item of security holdings as "United States Government and other marketable securities—$94,638,154," but earnings statement included solely a statement of gross income, without any segregation as to the proportion of earnings derived from operations and from investments or other sources.

N. Y. Stock Exchange has for some time been trying to secure from listed companies fuller statements of income and wherever possible details of security holdings. The efforts are part of a general campaign to secure more information for stockholders.

Company at the close of 1931 transferred from surplus to reserves for general contingencies $40,000,000 to be used in the protection of the company's operations and assets. At the annual meeting early this year it was disclosed that part of the new reserves had been provided to protect the value of the security holdings, which, it was stated, were marketable at $33,000,000 less than cost on Dec. 31, 1931. Balance sheet did not state whether securities were carried at cost or market.

Personal

Achievement in Rubber

Perkin Medal of the Society of Chemical Industry was presented to Goodrich's George Oenslager at a meeting held in the Grand Central Palace, New York, Jan. 6. Medal was presented to Mr. Oenslager for his contributions to the rubber industry, in particular, development of organic vulcanization accelerators and of the carbon black type of tire tread. A. E. Marshall presided.

Mr. Oenslager is chairman of the Akron section of the A. C. S. and is a member of the A. I. Ch. E. He is also chairman of the Akron Section of the American Archaelogical Society. He is a member of the committee to visit the division of chemistry at Harvard University and is a member of the Harvard Fund Council. His chief diversion has been travel and he is particularly interested in the ancient civilizations of the Southwest. He also enjoys fishing and hunting in the wilds of Canada.

Samuel Alsop, president, Alsop Engineering, is vacationing in Miami.

New Chemists' Club (N. Y.) members include E. J. Boehm, sales manager for National Aniline; E. R. Bridgewater, manager, rubber chemicals division, du Pont; A. B. Chadwick, Solvay Process vice-president; H. W. Hamilton, assistant manager, Koppers Products, Pittsburgh; H. L. Derby, Jr., assistant sales manager, Cyanamid & Chemical and son of H. L. Derby, president of that company.

Dr. Allan F. Odell, Du Pont Viscoloid research director, was the guest of honor at dinner given Dec. 23 by Baltimore branch, A. C. S. Dinner preceded lecture by Dr. Odell on alchemy, his hobby.

"Technocracy," as popular at the moment at America's breakfast tables as Walter Lippman, was "borrowed" by Author Howard Scott from a book published by 1921 Nobel Chemistry Prize winner, Prof. Frederick Soddy, Oxford University, according to John Macrae, president, E. P. Dutton & Co., publishers.

No Dearth of Medals

New scientific honor medal, endowed for the purpose of advancing human medicine was announced by Chemists' Club (N. Y.) president, George C. Lewis. Recipient of the first medal will be Professor John J. Abel of Johns Hopkins. Medal was endowed in perpetuity by Mrs. Madelyn Conne of New York and New Orleans in memory of her late husband—Philip A. Conne. It will be awarded annually by a jury of award selected by The Chemists' Club from among leaders of both the chemical and medical professions. Prof. Marston T. Bogert, Dr. Hans T. Clarke, and Dr. Lewis Marks represented the Chemists' Club.

Thirty-two year old Dr. Henry Eyring, Princeton research associate in chemistry, received Dec. 31 ninth annual $1,000 award of the American Association for the Advancement of Science.

Orlando F. Weber, Allied president, was an honorary pall-bearer at the funeral of B. Lord Buckley, founder of the Buckley School for Boys. Mr. Buckley died Dec. 26 at Mr. Weber's town-house at 22 E. 82 st., N. Y. City. President-Elect Roosevelt was also in attendance at the services.

Pierre S. Du Pont, chairman of the board of du Pont, and C. E. Adams, Air Reduction president, were among the guests at the recent Gridiron Dinner in Washington.

Sir Harry McGowan, I. C. I. chairman, sailed for India, Ceylon and Egypt, Dec. 22 on a brief business tour.

Personnel

Hercules Elects

Two new directors were elected to board of directors, Hercules Powder, Dec. 28. New members: A. B. Nixon, general manager of the company's cellulose products dept.; and P. B. Stull, general manager, Virginia cellulose dept. Creation of two new members brings number of Hercules directors to 14 and allows for the complete representation of each major department of the company on the board. All of the directors are active executives in the company.

A. B. Nixon has been general manager of the cellulose products dept. since 1928 and was formerly in charge of company's nitrocellulose plant at Gillespie, N. J. Mr. Stull has been general manager, Virginia cellulose dept. since 1928 and was formerly president, Virginia Cellulose Co. of Hopewell, Va., which was acquired by Hercules in 1926.

S. R. Bushnell is now with Noxon Chemical Products, Newark. Mr. Bushnell was formerly connected with Crystal Corp.

Ross Barbour succeeds Paul Foster Leach, taking over the selling of tanner products for Cataract Chemical Co.

Carl F. Miller & Co., 1008 Westers ave., Seattle, appointed sales representative in northwestern field by Glyco Products.

Foster Dee Snell has been appointed consulting technical editor of *Soap*.

Good News

Factory employment in chemical manufacturing continued through November the upward trend of the preceding two months. Increase in November, in comparison with October, was slight, being about 0.7 per cent. Last year, employment dropped almost 2.7 per cent. in November. Payroll totals were slightly lower in the chemical industry in November, compared with October; the drop was less than 0.2 per cent. Last year, payroll totals dropped 5.3 per cent. in November.

Employment in the chemical industries, was above the general average in November, and wages were much better maintained in spite of the slight decline from October.

Employment

	Nov., 1932	*Oct., 1932*	*Nov., 1931*
Chemicals	85.3	84.7	93.4
Fertilizers	46.0	45.1	46.8
Petroleum refining	61.5	61.8	67.4
Cottonseed oil, cake, and meal	54.7	54 1	56 8
Druggists' preparations	71.9	71.7	83 8
Explosives	79.0	75.7	94.3
Paints and varnishes	67.1	68.2	75.3
Rayon	142.8	139.6	149 5
Soap	98.3	96.9	99.0

Payroll Totals

	Nov., 1932	*Oct., 1932*	*Nov., 1931*
Chemicals	61.6	61.7	77.1
Fertilizers	30.8	30.1	38.3
Petroleum refining	52.0	52.2	64.2
Cottonseed oil, cake, and meal	47.0	44.9	63.0
Druggists' preparations	71.8	70 4	88.6
Explosives	54.1	51.2	78.3
Paints and varnishes	51.7	54.6	68.0
Rayon	120.2	118.3	132.6
Soap	83.0	84.4	92.0

Employment in chemical factories in New York State increased 0.1 per cent. during November.

Almost Lily-White

Chemical and allied industries contributed but a small fraction of total value of industrial bonds in default for year ending Nov. 1, 1932. Total of $657,616,000 set a new high record for all time. Following are given in detail outstanding chemical corporations' bonds in default of interest as of Nov. 1, 1932, with amount and date of default.

Industrial Defaults	*Amount*	*Defaulted*
Anglo-Chilean Nitrate deb 7s	13,650,000	May 1932
Atlantic Gypsum Prod. 1st 6s	3,114,000	Dec. 1930
debenture 6s	1,660,000	Aug. 1930
Celotex conv 6s	1,600,000	Nov. 1932
R M Hollingshead 1st 7s	635,000	Feb. 1932
Lautaro Nitrate conv 6s	31,897,000	July 1932

Heavy Chemicals

Institute Meets

Chlorine Institute holding its annual meeting and directors' meeting Dec. 16 elected officers as follows: S. W. Jacobs,

Sec. Robert T. Baldwin
Efficiency is recognized by continuance in office

vice-president, Niagara Alkali, president; E. C. Speiden, vice-president, Isco Chemical, vice-president; and Robert T. Baldwin, secretary-treasurer.

Three directors, N. E. Bartlett, E. C. Speiden and William B. Thom, were reelected. Board of Directors now consists of: S. W. Jacobs, Niagara Alkali, chairman; N. E. Bartlett, Penn. Salt; Thomas Coyle, R & H; J. F. C. Hagens, Great Western Electro-Chemical; H. M. Hooker, Hooker Electrochemical; John A. Kienle, Mathieson Alkali; E. C. Speiden, Isco Chemical; and William B. Thom, Westvaco president.

Nitrogen 1931 Figures

Bureau of the Census figures issued show that, according to a preliminary tabulation taken in 1932, value of nitrogen and fixed nitrogen compounds produced by manufacturers in this country amounted to $32,503,860 during 1931 at factory prices.

"Other nitrogen compounds," and gaseous nitrogen outputs amounted to $10,595,795 in value, compared with $9,898,626 during 1929. These totals include sodium nitrate, silver nitrate, bismuth subnitrate, sodium nitrate, etc. Separate classification of sodium nitrate probably was not given owing to the predominance of one synthetic manufacturer in the field.

Total represents a decrease of 15.2 per cent. from the $38,336,799 reported during 1929, the previous census year. These figures do not include ammonia and ammonia products of the coke and manufactured gas industries.

More important items which contributed to the total for 1931 follow: ammonia, aqua and liquor, 18,830,923 pounds; (NH_3 content), valued at $1,031,748; anhydrous ammonia, 127,100,718 pounds, valued at $8,043,679; ammonium nitrate, 20,558,372 pounds, valued at $844,502; ferric ferrocyanide (Prussian blue), 3,502,912 pounds ,valued at $1,134,364; nitric acid, 31,385 tons (basis 100 per cent.), $3,349,099, and nitrous oxide, 94,607,000 gallons, valued at $922,626.

Caustic Freight Rates

N. Y. P. S. C. has approved reduced freight rates of the D. L. & W. on liquid caustic, in tankcars, carload, minimum weight as per Rule 35, from Solvay and Syracuse to Fort Edward and Gansevoort on D. & H., 22 cents per hundredweight; reduction 3 cents; effective Jan. 15. Also rates of the Erie on the same commodity, carload, from Niagara Falls and Suspension Bridge to Fort Edward, on D. & H., 23.5 cents per hundredweight; reduction, 3 cents; effective Jan. 15. Also rates of the N. Y. C., east on the same commodity, carload, to stations on D. & H.; from Black Rock to Buffalo and East Buffalo to Ballston Spa, Ballston Lake, Saratoga Springs, Gansevoort and Fort Edward, 23.5 cents per hundredweight; reduction, 3 cents; from Solvay and Syracuse to Saratoga Spring, Gansevoort and Fort Edward, 22 cents per hundredweight; reduction, 3 cents; effective Jan. 15.

T. G. S. Shipments

Texas Gulf Sulphur shipped in fourth quarter largest tonnage of any quarter in 1932. Last quarter is usually the best, but improvement this year has been somewhat more than seasonal. Earnings for the period will be close to those of the third quarter, indicating a net profit of from $2.30 to $2.35 a share for the full year. Company's own deposit has been shut down for two months, resulting in a decrease in inventory.

R. R. Todd and three sons, who operate Todd Carpet Mills, Carlisle, Pa., have acquired Philadelphia Clay, with mines at Toland, Pa., near Carlisle. Company name will be continued, but main offices will be moved from Philadelphia to Carlisle.

Diamond Alkali's wartime income and profits tax controversy will be reviewed in part by the Supreme Court, which granted on Dec. 5 a writ of certiorari in one of two cases and refused a writ in the other.

Great Western Electro Chemical, San Francisco, has begun production of hydrosulfite of zinc. Product is being offered for sale to Eastern paper and pulp mills.

A plant for production of aluminum sulfate has been established at Treviglio, Italy. Up to now aluminum sulfate has mostly been imported from abroad, since aluminum producing rocks of la Tolfa (Civitavecchia) are not sufficient for the needs of the paper industry. Bayer process has been adopted, and the product employed is bauxite from Istria.

1931 Gas Figures

Value of compressed and liquefied gases made in U. S. in 1931 amounted to $56,455,106 at factory prices, according to preliminary report by the Bureau of the Census, this total being a decrease of 20.8 per cent. from 1929, the last previous census year when the value totaled $71,292,919.

(The figures for 1931 represent production; those for 1929 refer to sales, shipments or deliveries, by manufacturers. Where no separate figures are given for amounts made and consumed in the same establishments, the quantities and values relate to production for sale.)

	1931	*1929*
Compressed and liquefied gases made in all industries, aggregate value	$56,455,106	$71,292,919
Made in the compressed and liquefied gas industry, value	$41,372,643	$51,622,803
Made as secondary products in other industries, value	$15,082,463	$19,670,116
Ammonia, anhydrous—		
Pounds	127,100,718	173,349,355
Value	$8,043,679	$10,673,234
Carbon dioxide (not including "dry ice")—		
Total production, pounds	178,570,183	*
Made and consumed in the same establishments in the production of "dry ice," pounds	26,896,186	*
For sale—		
Pounds	†151,673,997	136,930,311
Value	$6,222,426	$6,931,735
"Dry ice" (solid carbon dioxide)—		
Pounds	84,954,018	‡
Value	$2,899,738	‡
Chlorine—		
Total production, pounds	361,739,705	398,943,703
Made and consumed in the same establishments, pounds	106,229,018	109,088,853
For sale—		
Pounds	255,510,687	289,854,850
Value	$5,248,496	$7,113,091
Acetylene—		
M cubic feet	741,039	969,534
Value	$12,867,449	$16,553,763
Hydrocarbon gases, other than acetylene, value	$1,613,714	$2,447,196
Hydrogen—		
M cubic feet	489,815	207,843
Value	$955,469	$1,423,456
Oxygen—		
Total production, M cubic feet	2,042,835	3,140,095
Liquefaction process	1,990,268	2,816,641
Electrolytic process	52,567	323,454
Value	$16,350,002	$23,409,606
Nitrous oxide—		
Thousands of gallons	94,607	109,812
Value	$922,626	$1,196,392
Sulfur dioxide—		
Pounds	16,104,534	17,600,936
Value	$839,021	$973,596
Other gases, value	$492,486	$570,850

*Data incomplete.

†Includes approximately 80,000,000 pounds piped to plants making "dry ice."

‡Withheld to avoid disclosing the production reported by individual establishments.

Asphalt Emulsions

Industrial adoption of a new method of manufacturing asphalt emulsions devised at Columbia University will banish the smoky, smelly "tarpots" used in road repairing, according to a report of Prof. A. W. Hixson and J. M. Fain. Asphalt emulsions now in use have failed to replace hot asphalt in road repairing, roofing and similar applications because of their tendency to break down, giving a surface which is not waterproof, it is explained, but the new emulsion is as efficient as the hot liquid asphalt and far easier to apply. It can be spread with a paint brush or a trowel, or it can be squirted on a surface with a paint or cement gun.

Italian sulfur exports for first half of 1932 totaled 125,374 metric tons, or somewhat more than half of the annual exports for the full years of 1930 and 1931, which were respectively, 241,814 and 240,533 metric tons.

Grasselli has recalled 40 employes on resumption of production at its Niles, O., plant.

Newberry Lumber & Chemical has reopened plant at Newberry, Mich.

I. C. I. has perfected a new type of screw lid for sodium sulfide containers of less than drum variety.

Fine Chemicals

Camphor Tariff Probe

Interested parties have been called upon by the Tariff Commission to supply data necessary to the probe it is conducting under Tariff Act of 1930 to ascertain percentage of domestic synthetic camphor supplied by domestic production during the six-month period beginning Dec. 18.

This probe is the first of a series directed by Paragraph 51 of the new law, and was inserted by the Senate as a compromise to prevent rate on synthetic camphor form being reduced from six cents per pound provided in the act of 1922, to one cent per pound as previously passed by both the House and Senate, commission explained.

American turpentine is the principal raw material for the commodity, which is used in the manufacture of pyroxylin and cellulose acetate plastics from which nonshattering automobile glass is made. Imports have averaged 2,000,000 pounds annually since 1927, coming chiefly from Germany. A review of the camphor situation was given in *Chemical Markets*, Oct. 1932, p. 235.

National Oil Products is now marketing a product high in concentration of vitamin D. Material is being sold to bakeries and dairies to be added to bread and milk. Process was patented by University Patents, Inc., a board set up by Columbia University, which granted National Oil an exclusive license for the manufacture and distribution of the product in the U. S. and Canada.

Leo L. Walsh has been appointed manager of National Oil Co.'s new offices in the Board of Trade Bldg., Kansas City, Mo.

January Pfizer price list shows three declines and no advances.

Citric and tartaric acid imports to Argentina have been much smaller this year than those in 1931. Totals for the first six months compare as follows:—Citric acid, 158,995 kilos, against 185,798 kilos; tartaric acid, 288,731 kilos, against 1,068,328 kilos. Italy supplies larger portion of both acids. Imports from U. S. are negligible.

New Temple of Research

Merck's new research laboratory will be dedicated March 1. Structure, started in 1932, will house in the south wing laboratories for pure research in biochemistry and pharmacology while the north wing will be used for applied research.

Central section will be used for offices of the directors of research, Dr. R. T. Major, director of pure research, and Dr. W. H. Engels, director of applied research. Dr. Joseph Rosin, technical director of the company and his staff will work on the second floor, which will also house a library.

A new lactic acid factory is to be erected in the Schilkowsk District by the Moscow Fermentation Trust. This plant is to have a capacity of 500 tons of 50 per cent. acid per year. Its raw material is to be the waste liquor of the starch industry worked up by a process that has been elaborated by Professor Schaposchnikow.

Abbott Laboratories, ordered a Christmas bonus of five per cent. of November salaries for all employees, following issuance of financial statement showing that for the first time in 23 months November sales and net profits increased from the corresponding month in the preceding year.

Phosphorus production was recently begun at Spoleto, Italy, by Societa Anonima Fosfero e Derivate.

Coal Tar Chemicals

Coaltar Imports

Imports of synthetic dyes into U. S. in November totaled 431,739 pounds and were valued at $394,949, it is reported by the Tariff Commission and Dept. of Commerce.

These figures compare with 440,879 pounds, valued at $343,308, imported during the same month last year. Imports during the first 11 months of 1932 have amounted to 3,627,644 pounds, valued at $3,230,979; imports in the corresponding period of 1931 were 4,514,503 pounds, valued at $3,906,422.

Origin

	Percentages November 1932	*Percentages November 1931*
Germany	61.84	73.68
Switzerland	35.81	25.13
England	2.04	.95
Other	.31	.24

Leading Dyes

	Pounds
Vat golden yellow CK double paste (single strength)	25,494
Trisulfon brown B. P. conc	17,495
Rapidogen ord. G	11,450
Vat printing yellow 5 GK dbl. (single strength)	7,200
Ciba brown G paste	6,977

Imports of aromatic chemicals during November totaled 5,279 pounds, valued at $7,745; imports in the same month last year amounted to 6,400 pounds, valued at $9,498. The total for the first 11 months of 1932 is 59,250 pounds, valued at $124,140, compared with 58,567 pounds, valued at $91,189, during the same period in 1931.

Medicinals, photographic developments, intermediates, and other coaltar products amounting to 128,077 pounds and valued at $97,703 were imported in November, compared with imports of 225,075 pounds of these products, valued at $51,759, during November last year. Imports so far this year have amounted to 1,228,655 pounds, valued at $639,824; imports in the first 11 months of last year were 1,641,497 pounds, valued at $703,693. Imports of color lakes during November amounted to 1,152 pounds, valued at $748. This brings total imports this year to 14,256 pounds with a volume of $8,977. Imports in the first 11 months of 1931 totaled 7,451 pounds.

Crude Coal Tar

Of total world production of crude coal tar in recent years, over 80 per cent. has come from U. S., Great Britain, Germany, and France. In 1931 share of the U. S. in world output was about 30 per cent., as against the 33-34 per cent. in previous years; that of Germany was 16 per cent., as against the 19-20 per cent.; that of Great Britain 24 per cent., as against the 21-23 per cent.; and that of France 10 per cent., as against the average of 8-9 per cent. of preceding years.

Chemical Foundation's charges that a number of German dye patents now owned by the Foundation were infringed by General Aniline, were denied in answer filed in the U. S. District Court in Delaware last month.

Status of Naphthalene

Chemical Trade Journal (London) points out editorially Dec. 9 that supplies of napthalene are becoming scarcer due to the general curtailment in by-product coking operations, says *Chemical Trade Journal:*

"Actual production of naphthalene in this country is not easy to ascertain, but it may fairly be taken that it has declined by from 15 to 20 per cent. in 1931, as compared with 1930, as have most coal-tar products. At the same time, British exports have been well maintained, amounting to 93,378 cwt. last year, as against the 82,000 cwt. of 1929 and the 11,300 cwt. of 1927. Bulk of these exports goes to U. S. market, and, from the value figures, is apparently of the crude quality. Other markets, particularly Japan, have been increasing their naphthalene imports, and there is considerable competition for the supplies available in international trade. Germany has now very little naphthalene available for export, whilst Switzerland, of course, is a net importing country. Imports of naphthalene into this country, as was shown in one of our recent issues, have declined progressively, and amounted last year to 9,470 cwt., practically all from Belgium, and, from value considerations, principally the refined material. With the continuous expansion in the world's dyestuffs manufacturing capacity, the demand for naphthalene derivatives as azo dyestuffs components is not likely to fall off. Further, the increasing adoption of the vapour-phase process of catalytic oxidation of naphthalene for the production of phthalic anhydride, itself to be used in the manufacture of vat dyestuffs and synthetic resins of the glyptal type, offer an additional extensive market for high-grade naphthalene. Another direction in which the use of napthalene, under the stimulus of agricultural research, is expanding, is in soil disinfectants and insecticides against plant pests attacking roots. It also seems that the general demand for naphthalene as a disinfectant and moth repellant in the form of napthalene balls and the like is rather more extensive than it was some years ago."

Benzol Figures

Production of benzol during 3rd quarter of 1932 showed new decrease in all producing countries (with one exception), this being particularly marked in France, amounting to 13 per cent., according to the recent report International Benzol Committee. Stocks of benzol are also said to be decreasing.

Purchases of benzol from abroad by various importing countries in Europe are reported to be decreasing, both France and Germany showing a decline in imports of benzol. Exports remain stationary for all European countries. Report includes tables giving production of benzol In European countries during 3rd quarter of 1932 and stocks on Sept. 30.

Census Data

A decrease of 20.8 per cent. in the value of coal tar products made for sale by manufacturers in U. S. in 1931 as compared with 1929 is shown by preliminary figures released Dec. 27 by the Census Bureau, in which f. o. b. factory value of the 1931 output is given as $103,532,687, compared with $130,651,757 in 1929.

Production of crudes, not including by-product crudes made in coke plants and gas works, last year totaled $20,641,540, against $26,370,143 in 1929, the bureau reported; intermediates production was valued at $18,907,349, against $25,593,686, and the value of finished products was $63,983,798 against $78,687,928.

The 1931 output of finished products, the report shows, included dyes valued at $41,388,299; color lakes, $2,268,440; photographic chemicals, $585,378; medicinals, $7,726,375; flavors, $1,957,348; perfume materials, $865,312; phenolic resins, $8,057,620, and other products, $1,135,026. Corresponding data for 1929 was incomplete, bureau stated.

Dept. of Commerce statistics indicate production of by-product coke was 1,751,581 tons in November, an increase of only 12,856 tons over October. Stocks on hand at producers' plants at the end of November amounted to 3,857,222 tons, or 4.2 per cent. less than on Oct. 31, and were the lowest for any month since June. Benzol production, as estimated from production of coke at by-product ovens known to recover benzol, amounted to 3,959,000 gallons, as compared with 3,847,000 gallons in October and 5,379,000 gallons in the same month last year.

Production of light oils amounted to 7,748,226 gallons in November, as compared with 7,691,616 gallons in October and 10,109,934 gallons in November last year. Output of tar in November totaled 23,295,320 gallons, as compared with 23,135,120 gallons in the preceding month and 30,395,880 gallons in November last year. Ammonia sulfate or its equivalent totaled 29,714 tons, as compared with 29,497 tons in October and 38,771 tons in November last year. Coking coal charged in by-product ovens amounted to 2,532,100 tons, as against 2,513,600 tons in October and 3,303,900 tons in November last year.

Naval Stores

Statistics

Production of turpentine and rosin in the U. S. in the crop season ended March 31, 1932, was valued at $16,505,745 at factory prices, according to Bureau of the Census in a preliminary compilation of data. This represented a decrease of 54.5 per cent. as compared with $36,281,632 reported in 1929, the last preceding census year. The output of turpentine distilled from crude gum totaled 24,341,824 gallons with an additional production of 3,141,094 gallons produced at wood-distillation plants. Rosin production from crude gum in the season totaled 1,570,885 barrels of 500 pounds each and there was an additional output of 333,512 barrels by wood-distillation plants. There were 953 establishments with 28,257 wage earners reporting in the 1931-1932 season as against 1,183 plants with 40,157 wage earners reporting in the 1929-1930 season.

In the October issue of *Chemical Markets*, p. 349, appeared the consumption figures for rosin and turpentine by consuming industries, stocks on hand as of March 31, 1932 and export and import figures for three successive years, compiled by the Bureau of Chemistry and Soils. These two reports make available a fairly comprehensive picture of the naval stores industry from a statistical viewpoint.

The following tabulation give comparative statistics on production for the two seasons:

Turpentine

	Gallons Season 1931–1932	Gallons Season 1929–1930
From crude gum	24,341,824	31,320,871
From wood distillation	*3,141,094	*4,619,253

*Production for calendar years, 1929 and 1931.

Turpentine Stocks

	Gallons Mar. 31, 1932	Gallons Mar. 31, 1930
At crude gum stills	495,522	642,429
By industrial consumers	871,439	1,247,333
At wood distillation plants	*324,636	752,858
At ports and distributing points	5,366,821	3,731,659
Totals	7,058,418	6,374,279

*Includes data for stocks at sulfate wood pulp plants.

Rosin

	Barrels of 500 lbs. Season 1931–1932	Barrels of 500 lbs. Season 1929–1930
From crude gum	1,570,885	1,975,631
From wood distillation	*333,512	*478,555

*Production for calendar years 1929 and 1931.

Rosin Stocks

	Barrels of 500 lbs. Mar. 31, 1932	Barrels of 500 lbs. Mar. 31, 1930
At crude gum stills	128,503	87,259
By industrial consumers	365,446	200,963
At wood distillation plants	90,540	91,498
At ports and distributing points	449,828	229,674
Totals	1,034,317	609,394

University of Florida is making a study of the naval stores industry of that state.

November production of naval stores by steam distillation and solvent treatment of wood and stocks of these products on hand Nov. 30, according to data collected by producers' committee, through Arthur Langmeier, Hercules Powder secretary, were as follows:

	Rosin 500-lb. barrels	Turpentine bbls. (50 gallons)	Pine oil Gallons
Month of Nov.	31,308	5,454	227,273
Total from Apr. 1, 1932	243,335	39,818	1,575,701

STOCKS

	Rosin	Turpentine	Pine oil
Total, Nov 30, 1932	98,048	10,602	....
Mar. 31, 1932	90,540	5,835	....
Change	+7,508	+4,767	....

Note.—Rosin production and stocks include all grades of wood rosin.

Thelma Naval Stores, Valdosta, Ga., has been chartered by Charles C. Gillican, representing naval stores interests in New Orleans. It will take over 36,000 acres of timbered land in Clinch County, Ga.

November foreign exports of spirits turpentine were 11,003 barrels of which 10,426 barrels represented gum turpentine and 577 steam distilled wood turpentine. Of rosins exports were 53,192 barrels gum, and 16,469 barrels wood, a total of 69,661 barrels.

Exports for November

Year	Bbls. S. T.	Bbls. Rosin
1932	11,003	69,661
1931	23,256	81,058
1930	20,828	94,184
1929	27,550	107,084
1928	30,643	90,567

April-November

Year	Bbls. S. T.	Bbls. Rosin
1932	172,412	742,961
1931	192,825	767,558
1930	231,765	916,792
1929	268,168	967,088
1928	212,308	852,237

Atlanta, Birmingham & Coast Railroad has purchased 17 acres of land and leased it to the Taylor, Lowenstein Co. of Mobile, Ala. Lease is to be followed immediately by expansion of the company's local plant, entailing more buildings, an increased force and a gain in the amount of rosin and turpentine handled. Taylor, Lowenstein are among the largest naval stores producers and dealers in the South.

McLeod Turpentine's plant at McLeod, Miss., recently destroyed, has been rebuilt.

Metals and Alloys

New Zinc Plan

Zinc cartel has virtually decided upon an experimental trial of one month for a new system along the lines of the old steel cartel. While continuing to restrict operations to 45 per cent. of capacity, better equipped plants will be permitted to exceed quotas on the condition that they pay fines based on the current prices and percentage of excess, while poorer equipped plants failing to attain quotas will be entitled to compensation.

International Silver is appealing to Supreme Court for a review of the decision of the Circuit Court of Appeals which held the Fink patent, No. 1581188, assigned to United Chromium, discloses an invention and is valid.

Utah Vanadium Corp. is erecting concentrating plant on its property in Henry mountain district southwest of Green River, Utah.

Climax Molybdenum, Climax, Colo., will increase its production, to 100,000 pounds per month.

U. S. Bureau of Standards is working on improvements in chromium plating technique.

Dr. C. A. Basore, Alabama Poly, is reported as having perfected a development for the manufacture of glass from blast furnace slag.

Gerhard Wagner has been appointed American representative of the Vereingte Chemische Fabriken zu Leopoldshall, Germany, for the sale in this country of metallic gallium and rhenium, of which it is the world's only manufacturer.

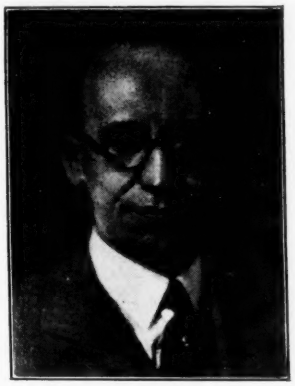
Pickling Metals

In pickling or cleaning metals with dilute non-oxidizing acids a small proportion of a "natural or synthetic ichthyol or ichthyol sulfonate" may be added to the acid to prevent attack of the metal. Natural ichthyol products are prepared by the sulfonation with concentrated sulfuric acid or oleum of the sulfur-containing oils obtained by the low temperature carbonization of certain oil shales. The acids or their soluble salts may be used. Synthetic icythyols or ichthyols sulfonates are prepared by sulfonation of the product obtained by treating mineral oils with sulfur at about 200° C. or by the sulfurization of sulfonated mineral oils. Dry or pasty products for addition to the pickling or cleaning acid may be obtained by mixing the ichthyol product with salt of a foam-producing agent.

Solvents

Alcohol Figures

Industrial alcohol plants in the U. S. in the year ended June 30, produced a total of 146,950,912.76 proof gallons of alcohol, according to annual report of Dr. James A. Doran, Commissioner of



Commissioner Dr. James A. Doran reports production decline

Industrial Alcohol. Total was a decrease of 19,063,433.39 proof gallons from the quantity produced in the preceding fiscal year. Decrease, it was stated by the commissioner in his report, was attributed to the business depression prevailing during the year in those industries using alcohol as a raw material, also to the policy of the alcohol bureau in limiting production to alcohol needs, and to the decrease in the use of the denatured alcohol as an anti-freeze solution for automobile radiators.

Withdrawals of industrial alcohol from warehouses on payment of tax during the fiscal year amounted to 6,149,767.42 proof gallons, a decrease of 1,248,752.12 proof gallons as compared with the quantity withdrawn in the preceding fiscal year. There were also withdrawn for tax-free purposes, including denaturation, export, and use of U. S. government, hospitals, laboratories, colleges and other educational institutions, a total of 135,554,158.07 proof gallons, which was a decrease of 16,618,028.20 proof gallons as compared with the preceding fiscal year. Withdrawals during the fiscal year, from bond, tax free, of alcohol and rum for denaturation aggregated 132,578,234.75 proof gallons against 149,303,438.59 proof gallons withdrawn for that purpose in the previous fiscal year.

14,242,270 Gallons Synthetic!

From the total of 132,578,234.7 proof gallons of ethyl alcohol withdrawn for denaturation, 34,298,235.54 wine gallons of completely denatured alcohol were produced and 44,031,281.80 wine gallons of specially denatured, making a total of 78,329,517.34 wine gallons of denatured alcohol produced within the fiscal year. These figures compared with a total of 149,303,438.5 proof gallons of ethyl alcohol withdrawn for the purpose during the previous fiscal year from which 49,136,200.64 wine gallons of completely denatured alcohol and 37,172,740.71 wine gallons of specially denatured alcohol, or a total of 86,308,941.35 wine gallons of denatured alcohol were produced in the fiscal year 1931.

Production of industrial, or ethyl alcohol during the fiscal year ended June 30 was obtained from the following sources:—124,552,374.96 proof gallons from molasses 5,506,755.44 proof gallons from grains, 1,271,737.60 proof gallons from grain molasses chemical mixtures and so forth, 14,242,270 proof gallons synthetically, and 1,377,774.76 proof gallons from other raw materials.

Comparative figures for production of industrial alcohol were as follows:

	Proof Gallons
1932	*146,950,912.76
1931	166,014,346.15
1930	191,859,342.42
1929	200,832,051.08
1928	169,149,904.83

*Includes alcohol produced in Porto Rico.

Butanol and acetone are now manufactured in Holland by fermentation process at the Dutch Yeast & Alcohol Factory, Delft.

Bureau of Internal Revenue, Washington, has issued a ruling in which it holds that imports of naphtha, except technical naphtha, will be subject to the tariff of 2½ cents per gallon. This compares with the assignment of one-half cent per gallon previously applied. Order, signed by Secretary of the Treasury Mills, will become effective in 30 days. Naphtha previously had been regarded as not being motor fuel but investigation by the Treasury Department showed that large amounts of the product have been imported for use as gasoline. Order is designed to stop this practice.

Lord Shaughnessy, president, Canadian Industrial Alcohol, at annual meeting held in Montreal, stated that company had been adversely affected by price-cutting in export business and reduced demand for liquor. Although domestic business had fallen off, he said, profits from this department actually had increased. Export sales declined by 25 per cent. to lowest level in ten years while export prices were lowest in company's history.

Alcohol From Peat

It is reported that the Soviet Scientific Research Institute for the Peat Industry has succeeded in working out process for manufacture of alcohol from peat. At present a semi-large scale plant is being erected for the further investigation of the process. Alcohol is intended primarily for manufacture of synthetic rubber.

Textile Chemicals

That Dye Cartel

Chemical Foundation head, Francis P. Garvan, a "Prophet crying in the wilderness," attacking single-handed Germany's

Chief C. C. Concannon sees dire threat to U. S. in dye field

reassumption of international dye control, received aid from an unexpected quarter during the past month. Chief C. C. Concannon, chemical division, Bureau of Foreign and Domestic Commerce, digging deep into his Washington files and drawing heavily on his lieutenants in dye-producing countries, found real cause for alarm when he had compiled a huge mass of export and import statistics. Said Chief Concannon Dec. 24:

"For the first time since Germany's prewar supremacy the European coal-tar dye industry presents a solid front in the trade marts of the world. . . . .

"European dye cartel of today is the latest development of a careful plan initiated in 1927 as a Franco-German dye marketing agreement, to which Swiss producers definitely became a party in 1929. Spain automatically came under the control of the convention when its dye industry was acquired by German interests, while German and Swiss ownership in Italian dye factories aided in the final inclusion of Italy in 1931. After years of negotiation, Great Britain recently became a signatory country, with Poland becoming the seventh and latest member of the entente. Only two European producers of importance remain outside the direct control of the pact—Russia, which is said to consume all of its own output, and Czechoslovakia, whose exports are comparatively insignificant in world trade.

"Although total world dye exports showed improvement in 1931 over the somewhat adverse conditions of 1930, the advance was due entirely to increased shipments from the four major units of the European dye cartel, Germany, Switzerland, Great Britain and France. U. S. and Italy were the only two important dye exporters who failed to increase their shipments abroad in 1931. The seven countries now subject to the provisions of the dye pact accounted for 84 per cent. of the total world exports of 160.3 million pounds in 1931, while their aggregate output is estimated to total about 250 million pounds. World export trade during the current year is undergoing severe contraction reflecting the restricted purchasing in consuming markets. Chinese dye consumption is only about 40 per cent. of normal and in addition a shift is reported from indigo to the cheaper sulfur colors, similar depressed conditions being true of most world markets.

"European dye cartel revolves chiefly around the international activities of the German dye industry. Germany is the most important single factor in the world dye trade, accounting for approximately 60 per cent. of all exports in 1931. Other countries recorded as follows: U. S., 13 per cent.; Switzerland, 11 per cent.; Great Britain, 8 per cent.; France 4 per cent.; Japan, 3 per cent.; other countries, 1 per cent. It is particularly true in the case of Germany, Switzerland, and France, however, that their exports are far from representing the share each country supplies of world consumption because of branch plant output in foreign countries, dyes other than of their own manufacture sold through their foreign agencies, and trade directly controlled by their agreements with other producers, as well as the large amounts sold on domestic markets.

Germany's Influence

"Germany has interests in large dye producing plants in Italy, Spain, and the U. S. It also owns jointly with French interests an important Swiss plant which has a branch in France. Leading French producer also owns a dye factory in Poland. Three Swiss dye producers, who have formed a sales consortium, own more plants abroad than any other one national group, with factories in Italy, the U. S., Poland, Great Britain, and France. This network of factories serves to bind the interests of the members of the dye cartel more closely together, besides increasing the scope of cartel control.

"Main features of the various agreements which have led up to the present dye cartel have been (1) reduction of competition through apportionment of markets, (2) allocation of export quotas, (3) maintenance of price levels, and (4) in Germany, France, and Switzerland, the interchange of technical information."

The Real Danger

Statistics released with Mr. Concannon's announcement indicate that the U. S.—dependent almost entirely 15 years ago on Europe and particularly Germany for its dye supplies—is now an important factor in the export dye markets of the world. This is a condition little realized even within the chemical industry. Fears of Messrs. Garvan and Concannon are not that we may be shut off unexpectedly from necessary supplies of dyes, but that we are in imminent danger of losing valuable export markets to members of the dye cartel.

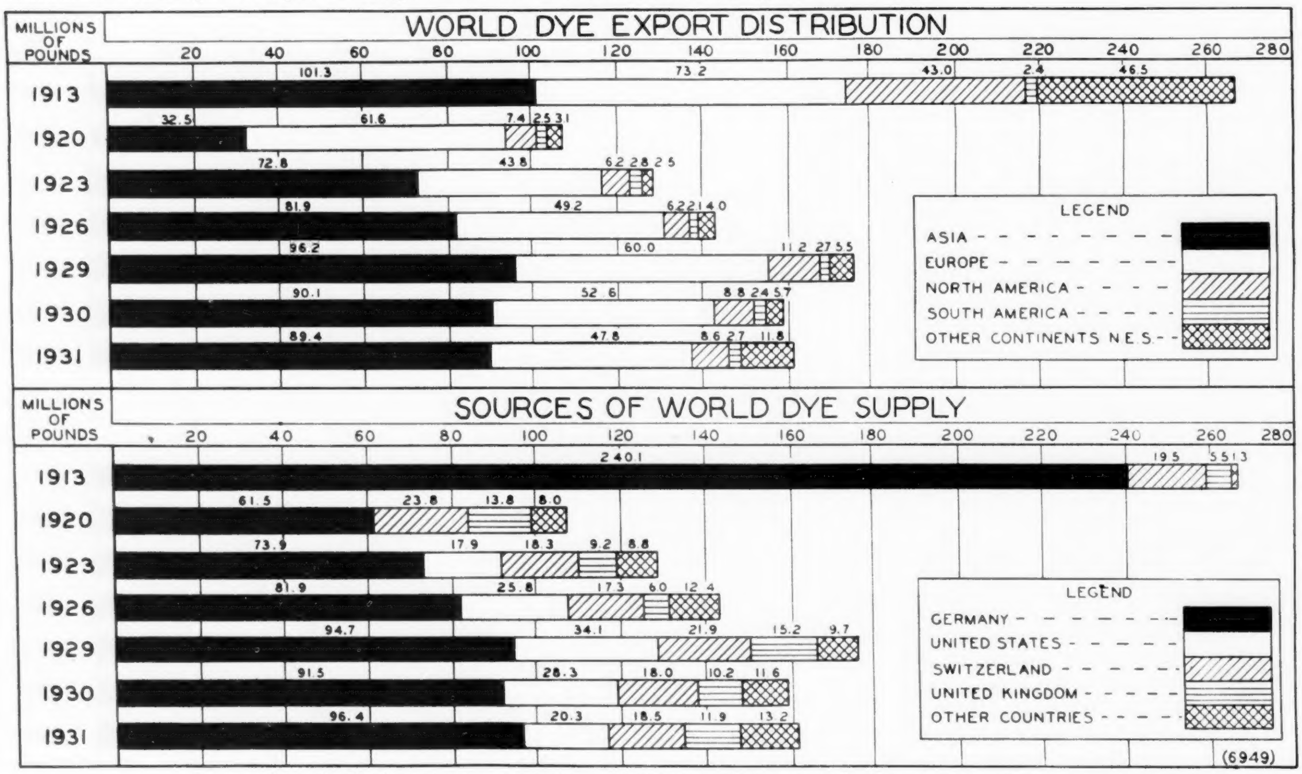
American Aniline Products, is opening a larger branch establishment at Charlotte, N. C. Branch will include offices, laboratory, and storage and mixing rooms. A. S. Cooley is manager.

R. E. Rose, director, technical laboratory, du Pont, was elected president, American Association of Textile Chemists and Colorists at its annual meeting in Greensboro, N. C.

Du Pont New Dye

Pontamine Fast Orange 7R, a direct color slightly redder in shade than Pontamine Fast Orange ER, was announced Dec. 16 by the dyestuffs division of du Pont. Its property of dyeing cotton and leaving wool white when speck dyed is said to make it an extremely useful color for the dyer of union materials. When speck dyed in full shades Acele effect threads are stained a trace and silk effects are left white. Pontamine Fast Orange 7R is very soluble and level dyeing, and may be used in all types of machines. It may be economically applied to rawstock, yarn, or piece goods for fast to light shades.

Emulso Laboratories, 57 Clementina st., San Francisco, is now producing an industrial soap which emulsifies in salt water.



Prepared by C. C. Concannon, chief chemical Division, Bureau of Foreign & Domestic Commerce

Fertilizers

Still Another Fertilizer!

Ammoniated peat, a new fertilizer material, has been developed in the laboratories of the Dept. of Agriculture. It seems to combine many of the good features of the two familiar types of nitrogen-carrying fertilizers. It has not been developed commercially yet, but chemists of the department say that the manufacturing process is simple and relatively inexpensive and that the commercial production of ammoniated peat offers opportunity for material saving in freight on fertilizers. Small scale experiments with plants have given promising results.

Anhydrous ammonia is suggested as the source of nitrogen. It may be shipped by tank cars from the nitrogen fixation plants to the fertilizer factories. Utilization of peat for the preparation of ammoniated peat offers commercial possibilities, the Department chemists say, because peat is widely distributed and occurs within short distances of the principal fertilizer consuming centers. Preparation of air-dried peat is an inexpensive operation and the addition of ammonia demands merely provision for heat and pressure. Preliminary experiments indicate that peat is not the only possible carrier, but that similar results may be obtained with various carbonaceous materials ranging from lignite to plant residues of various sorts.

November Tag Sales

Fertilizer tag sales in 16 states during November were 15 per cent. less than in November, 1931, according to the N.F.A., November sales ordinarily represent less than two per cent. of the year's total sales. In the South, tag sales covered approximately 60,000 tons against 70,000 tons in November, last year, and 72,000 tons in November, 1930. Florida made the best showing in the South. Sales of tags in 16 states for the first eleven months cf 1932 were 63 per cent. of the comparative period of 1931, amounting to 2,653,151 tons against 4,232,312 tons in 1931.

I. C. C. will hold a further hearing on fertilizers and fertilizer materials between southern points, to be held Jan. 16, at ten a. m., in Washington, Hearing will be for the purpose of determining whether or not the item "bones, other than human or fresh-meat bones: ground, in bags or barrels, c. l.; not ground, in packages or in bulk, c. l." is to be eliminated from the list of fertilizer materials.

George J. L. Metz and his son, Edward L. Metz, have formed Metz & Metz of Fayetteville, N. C., who will do a general fertilizer and material business.

Transfer of Armour Fertilizer's general offices, from Chicago to Atlanta, has been completed, and new quarters in the Walton Building were opened Dec. 27. Among the executives of the company who have moved to Atlanta are: John E. Sanford, president; J. A. Woods, vice-president in charge of sales; G. C. Venard, vice-president in charge of purchases; C. F. Hagedorn, vice-president in charge of manufacturing, and John A. Becker, secretary and controller.

Rumors are heard that leading steel companies, including U. S. Steel and Carnegie Steel, may enter into production of ammonium phosphate as a means of disposing of their by-product ammonia. Ammoniated superphosphate is another product under consideration.

Secretary of War Hurley in his annual report has suggested that 1931 Muscle Shoals Commission report, including the proposed production of phosphoric acid, should be enacted into law.

Final Potash Figures

German potash production in 1931 according to final figures was 8,050,000 metric tons—3,912,000 tons less than 1930. Expressed on a K2O basis, 1931 figure of 1,080,000 tons was 32 per cent. less than the 1930 output of 1,609,000. Carnallite, which in 1924 accounted for 35 per cent. of the salts mined, suffered a further drop in 1931 to 13 per cent. of the total salts mined, as compared with 15.6 per cent. in 1930. Almost 82 per cent. of 1931 mine output was refined as compared with 80 per cent. in 1930.

In process of refining the salts mined were reduced to 3,104,000 tons of marketable potash salts with a content of 941,000 tons of K2O, as compared with 4,532,000 and 1,381,000 tons. respectively, in 1930. Kainit and crude salts accounted for 42 per cent. of the total marketable product; manure salts, 18-22 per cent., 6 per cent.; salts, 28-48 per cent., 33 per cent.; potassium chloride, 13 per cent.; potassium sulfate, 4 per cent.; and potassium magnesium sulfate, 2 per cent.

Japan is now said to be buying sulfate of ammonia for its own consumption and is reported to have withdrawn quotations on the Pacific Coast. The domestic market price was advanced Dec. 7 from 65 to 95 yen per ton.

Canadian import tariff was recently amended to permit importation of nitrate of soda from all sources duty free. It hitherto was dutiable at 20 per cent. under the general tariff and free under British preferential tariff.

Harold S. McCormick, for 22 years with H. J. Baker & Bro., was admitted to partnership Jan. 1.

U. S. Potash is shipping 175 tons of potash daily from its refinery near Loving, New Mexico.

Ammoniaque Synthetique et Derives, large synthetic nitrogen producer in Belgium, is reported to have developed new process for the manufacture of an ammonia nitrogen-base fertilizer alleged to eliminate certain leaf and root diseases of plants and to be produced at prices less than competitive products now on the market.

May Appeal

Verdict of $238,666 against U. S. Potash awarded Dec. 18 to V. H. McNutt, geologist, by the Federal District Court for service in connection with the development of the Carlsbad potash field, said to be the largest potash deposit in the world, may be appealed. It was said at San Antonio that company will take the case to the Circuit Court of Appeals.

Japs Stop Licenses

Cancellation of Japanese regulations making compulsory licensing of imports and exports of ammonium sulfate has been announced. Regulations were issued Dec. 8, 1931, but were not put into effect with respect to exports, although applied to imports beginning Jan. 15, last.

Ruhr-Chemie A.-G., Essen, operating synthetic ammonia plant with coke oven hydrogen, reported plant worked at 30 per cent. of capacity for the year ended June 30. This condition existed throughout the entire German nitrogen industry. Ruhr-Chemie produced both sodium nitrate and ammonium sulfate for export.

Exports of nitrogen from Germany totaled 444,732 metric tons for the first eight months of this year, compared with 575,066 tons in the corresponding period in 1931. Exports of sulfate of ammonia and calcium nitrate showed greatest shrinkage; exports of nitrate of soda were much increased. No sulfate was exported to U. S., Belgium, or Russia. Exports to Spain were substantially larger, and increases were shown in the trade with Denmark and the Phillippines.

	Metric tons (Eight months)	
	1932	*1931*
Ammonia carbonate	810	1,820
Chloride	8,456	13,974
Nitrate	1,480	3,422
Sulfate	209,427	339,298
Calcium nitrate, urea, and unlisted compounds	25,356	137,232
Cyanamid	63	369
Nitric acid	6,523	8,391
Nitrites	863	1,735
Nitrophoska	9,631	13,745
Potash nitrate	21,611	20,097
Soda and potash cyanides	3,682	3,516
Soda nitrate	156,830	31,467

Paints, Lacquers and Varnish

Sales Decline

Sales of paint, varnish and lacquer products during October, as reported to the Bureau of Census by 588 manufacturers totaled $15,591,319 in value, according to preliminary figures, compared with a revised total of $16,805,712 in the preceding month. The total in October a year ago was $20,741,915. Total classified sales in October, reported by 344 establishments, were $10,605,453 against $11,197,312 in September. October trade sales were $6,608,588 against $7,216,748 in the preceding month. Industrial sales in October totaled $3,996,865, of which $3,036,688 was paint and $960,177 lacquer. This compared with a total of $3,980,564 in September, of which $3,113,303 was paint and $867,261 was lacquer. Total sales reported by 588 manufacturers from January through September were $181,308,046 against $248,765,917 in the corresponding period of 1931.

Chester P. Rahr, formerly president Flinkote Co., has been elected a vice-president of Certain-teed Products, filling vacancy which had existed for several years.

Italy has extended royal decree 1488 for another year permitting importation of nitrocellulose lacquers and solvents used in finishing automobile bodies. Italian lacquer producers recently petitioned for a higher duty on imported lacquers.

Priming coat specifications have been issued by Bureau of Standards in Miscellaneous Publication, 137, five cents each, Supt. of Documents, Washington.

Zinc in Paints

Metallic zinc paint, which is now being used to an increasing extent in the U. S. has as its principal pigment a metallic zinc powder, of such an extreme fineness that it is frequently referred to as "zinc dust." This powder, produced by a distillation process in specially designed furnaces, and is mixed with zinc oxide in a linseed oil vehicle of the usual type. Metallic zinc paint has been found to be a particularly effective protection against corrosion for all exposed metal surfaces. It has been used not only on steel buildings and other structures, but on electrical equipment, on the inside and outside of water tanks, on the hulls of battleships, and under many other difficult conditions. An educational campaign, to explain merits of metallic zinc paint, is being carried on by American Zinc Institute.

International Gypsum incorporated in St. John's, Newfoundland, to develop gypsum deposits at Flat Bay Brook on properties owned or controlled by William H. Taylor. Company plans to export hydrous calcium sulfate and to make and export plaster.

A. W. P. Buchanan, K. C., has been elected director of Sherwin Williams Co. of Canada, with headquarters at Montreal. Other directors were reelected.

C. J. Osborn Co., has appointed as sales representatives to the paint, rubber, and printing ink trades, White & Co., Cleveland, and Akron, Ohio, and Wallace & Farnsworth, Detroit.

Wyo-Dak Chemical, Jerome Siding, Wyo., is constructing new bentonite mill. Offices are in Cleveland.

Conference to prepare system for grading casein will be held in Washington Jan. 13 by Bureau of Dairy Industry.

Paint and oil interests are represented on new board of directors, Associated Industries of Kentucky. Included in the list is Robert P. Bonnie, Kentucky Color & Chemical.

Arthur H. Gabel, Rochester, N. Y. has joined McDougall-Butler Co., Buffalo, as director of industrial finishes division.

Hercules has reduced price on new liquid resins, Abalyn and Hercolyn, products introduced to the trade within the past year. Increased sales and resultant decreases in manufacturing costs make possible the reduction, according to Hercules naval stores officials.

New prices, representing reductions of from 10 per cent. to 25 per cent., are 13c per net pound, with drum, on Abalyn, and 17c per net pound, with drum, on Hercolyn.

Abalyn and Hercolyn are liquid resins that have been used as a combined resin and plasticizer in inks, nitrocellulose lacquers, and certain plastic compositions. Manufacturers of adhesives, nitrocellulose lacquers, special inks, and special coating compositions have successfully used them.

CHEMICAL STATISTICS—SURVEY OF CURRENT BUSINESS

Year and month	General operations					Alcohol			By-product coke	Explosives	Rosin, wood	Turpentine, wood	Superphosphates	Fertilizer		
	Employment		Pay rolls, unadjusted	Stocks		Ethyl	Refined methanol	Synthetic methanol						Consumption [2]	Total imports	Nitrate of soda imports
	Unadjusted	Adjusted [1]		Manufactured goods	Raw materials	Production										
	Monthly average, 1923-1925=100					Thousands of gallons			Thous. of short tons	Thous. of lbs.	Barrels		Thous. of short tons		Long tons	
1930: October	101.4	101.1	99.9	125	133	18,455	576	966	3,408	34,113	34,818	5,817	395	106	147,546	27,907
1931:																
October	85.7	85.4	80.8	125	121	16,037	56	510	2,389	25,282	26,102	3,922	188	98	120,822	33,968
November	83.5	83.1	76.4	129	134	14,084	87	364	2,276	24,509	21,440	3,547	179	66	77,849	29,871
December	82.0	81.9	75.0	124	125	14,002	142	328	2,234	18,595	23,242	3,733	231	67	70,754	17,029
1932:																
January	81.7	81.9	71.4	128	116	13,224	149	586	2,101	18,175	23,196	3,626	215	172	89,070	30,114
February	81.1	80.2	71.0	135	107	10,340	120	546	1,996	18,064	20,006	3,121	204	365	84,160	8,404
March	81.1	78.6	70.1	134	101	9,526	103	514	2,089	17,092	26,187	4,329	170	644	100,136	54
April	82.4	78.5	68.5	134	97	10,137	113	502	1,883	16,804	26,443	4,415	147	868	61,433	2,675
May	78.3	79.7	66.9	131	93	11,578	72	743	1,743	17,097	30,597	5,151	86	156	84,746	37
June	74.2	76.4	63.2	118	91	10,500	97	712	1,537	14,195	29,483	4,827	62	68	57,388	647
July	72.3	74.7	60.0	120	88	11,908	84	794	1,523	12,728	30,076	4,878	70	14	49,999	100
August	72.2	74.0	60.0	116	90	12,365	151	793	1,474	18,340	31,141	4,861	113	40	57,586	0
September	74.0	73.7	59.8	121	112	13,355	102	698	1,544	19,938	31,155	5,020	117	97	87,502	517
October	**75.1**	**74.9**	**60.7**	**120**	**122**	--------	**198**	**571**	**1,739**	**22,996**	**33,132**	**5,202**	--------	**98**	**83,262**	**13**
Monthly average January through October:																
1930	105.8	105.9	105.6	130	107	[3] 12,231	405	646	3,903	32,789	40,082	7,057	[3] 382	546	178,160	49,761
1931	90.2	90.2	86.3	124	97	[3] 11,927	149	645	2,794	26,489	29,102	4,884	[3] 239	394	130,645	50,188
1932	**77.2**	**77.3**	**65.2**	**126**	**102**	**[3] 11,326**	**119**	**654**	**1,763**	**17,543**	**28,142**	**4,543**	**[3] 132**	**252**	**75,528**	**4,256**

[1] Adjusted for seasonal variation. [2] Southern States. [3] 9 months' average.

Oils and Fats

Battle in Washington

Philippine independence leaders and the vegetable oil industry clashed in Washington during the past month over provisions of the Hawes-Cutting measure. Declaring that the American farmer is suffering intensely from the competition of cocoanut oil coming in free from the Philippines, various farm bloc leaders were successful in writing into the bill an amendment cutting from 200,000 to 150,000 tons the permissive annual duty-free entry of cocoanut oil. It was declared on the Senate floor that American cotton farmers "were being impoverished and cottonseed oil mills closed by free importation of cocoanut oil from the Philippines."

Farm leaders also charged that the foreign owners of Philippine cocoanut and sugar plantations are actively working to bring about sentiment against independence both in this country and in the Islands. Further, it was insisted that if the question of final independence was put off for 17 years (Hawes-Cutting bill) that by that time owners of such plantations would be able to influence sentiment so strongly against the idea of independence, that in all probability, the Filipinos would vote against accepting complete separation from this country.

It is expected that any measure giving freedom to the Philippines either immediately or in the next few years will be vetoed by President Hoover. He is known to hold the viewpoint that the Philippines are not as yet ready for independence.

Flaxseed Crops

Of particular interest at the moment because of the higher prices for linseed is the Dept. of Agriculture's forecast of a world flaxseed crop for the current season materially less than the 155,000,000 bushel crop of last year.

Estimates of the crop in 12 countries that have so far reported to the Department total 85,582,000 bushels, or about 71 per cent. of the harvest in the same countries last year.

This total includes important flax-producing countries of the world except France, Uruguay, Poland and Russia. Of these countries the acreage planted to flax in Poland this year is estimated to be the same as last year, 252,000. Uruguay has increased the acreage devoted to flaxseed by approximately 44,000, making a total of 487,000 sown. Official estimates for Russia and France are not available. Although acreage planted to flaxseed in Russia is reported to be larger this year than last, general conditions have not been wholly favorable to the crop.

Imports of flaxseed into U. S. during September and October amounted to 1,040,000 bushels, only one-third of the takings for the same month last year. On the other hand, because of prevailing low price European takings were considerably larger for the first two months of the present crop year than for the same months in 1931.

Production, consumption, stocks, imports and exports of linseed oil for the third quarters of 1932 and 1931 compare as follows:

	Gallons *Third Quarter 1932*	*Third Quarter 1931*
Stocks, June 30	15,477,584	10,426,641
Production, July, August, September	9,133,703	18,827,321
Imports, July, Sug., Sept.	776	1,331
Totals	24,612,063	29,255,293
Less stocks, Sept. 30	12,999,412	14,334,389
Consumption, July, Aug., Sept.	11,612,651 Decrease 22.17% Under 1931	14,920,904 Decrease 15.96% Under 1930
Exports	36,229	34,665
12 mos. consumption—		
(In gallons)	49,941,917	....
(In bushels)	19,976,767 Decrease 24.82% Under 1931	....

Helping Fish Oil Industry

California state action last month again came to the aid of the California sardine industry in the form of a second grant of permit to process fish wholly for reduction purposes. In addition to a total of 75,000 tons of fish set aside last August, there is now an additional 37,500 tons made available for reduction to oil and meal without the restriction of packing any of the fish for human consumption during the present season. This means that 15 packing houses may each reduce 2,500 tons on this basis, plants in the north, comprising the Monterey district, being obliged to finish their operations by the middle of February, and the last day of March being allowed for completion by the southern California concerns at Terminal Island. These two dates comprise the official season closings in California.

During the calendar year 1931 (which does not provide for the seasonal total, but part of two seasons) there were 3,924,692 gallons of sardine oil produced in California, the bulk of which, 3,098,817 gallons, was manufactured in the Monterey district. Meal production for the entire state amounted to 22,440 tons. Compared with the 1930 statistics, this was off about 2,000,000 gallons in oil and approximately 13,000 tons in meal.

Oil Trades Association of New York will hold its next quarterly meeting Jan. 24 in the roof garden of the Waldorf-Astoria.

Hendrick E. Hendrickson, S. Winterbourne & Co., was re-elected president, American Gum Importers' Association Dec. 19. O. G. Innes, Innes & Co., was re-elected vice-president and A. J. Wittenberg, Stroock & Wittenberg, was again chosen secretary.

South Manchuria Railway Co. reports production of soya beans in Manchuria during 1932 is about 800,000 tons smaller than last year. Production in 1932 totalled 4,414,447 tons compared with 5,227,010 tons a year ago. Area sown to soya beans shows a decrease of 10 per cent. In 1932 the area sown was 3,892,481 hectares (hectare—2.47 acres) against 4,200,590 hectares in 1931. The decrease in planting was due mainly to Manchuria conflict and destructive floods in North Manchuria.

Journal of Chemical Education, January, 1933 contains a splendid article on "The Soy-Bean Industry in the U. S." by A. A. Horvath.

Norwegian 1932 production of whale oil as well as coming 1933 season's output has been purchased by Unilever interests, the Anglo-Dutch oil, soap and margine combine.

J. H. Redding, former president of the Niger Company, and of its successor United Africa Inc., has announced organization of J. H. Redding, Inc., at 17 Battery Place, N. Y. City. New company will specialize in palm oils and cocoa beans.

Menhaden Production

Production of crude menhaden oil in Chesapeake Bay section the past season exceeded that for the past five years by approximately 20,000 barrels. Total production was between 40,000 and 50,000 barrels, which compares with 27,926 barrels last year. Price range, however, for the season was lower than in the past 25 years, opening at 12½ cents a gallon f. o. b. Baltimore and closing at 9½ cents a gallon.

Linseed Association of New York held its annual dinner-meeting Dec. 14 in the Produce Exchange Luncheon Club with approximately 50 members and guests present, and re-elected E. J. Cornish, president of National Lead, as president.

Recent reports show that Lever interests are shipping palm oil directly to Canadian ports from Africa. Formerly a large portion of Canada's palm oil requirements was supplied by trans-shipments from U. S.

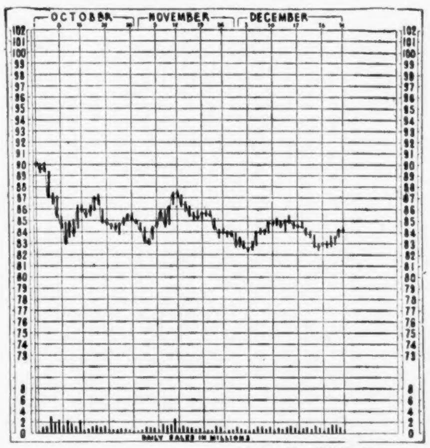
Tariff Commission, Washington, has set Jan. 16 as the date for hearing in its investigation of the linseed oil industry.

The Financial Markets

December Financial Trend

Stock market trend turned upward in December after declining steadily for four months. Trading was in exceptionally small volume and the movement was restricted within an area of approximately two points throughout the month. In fact, the volume of business transacted, was the smallest done in several years and reflected a general condition of apathy on the part of the public to the market. Total gain in values approximated only three per cent. However, this contrasted with a loss of five per cent. in November and 18 per cent. in December 1931.

Daily Record of Stock Market Trend



N. Y. Herald-Tribune

The hesitancy was ascribed mainly to two conditions; one, the uncertainties surrounding the foreign debt settlements of Dec. 15, and, two, the desire on the part of the financial community to await the outcome of measures now before Congress designed to adjust the nation's finances and particularly to balance the federal budget. The course of the market in the first 10 days of the month was generally upward. Between the 10th and the 17th values remained practically stationary; the week immediately preceding Christmas was one of generally lower prices and the loss was mainly due to the severe declines in most of the commodity markets. In the final week of the month and year a better feeling became apparent and the majority of groups closed firm and slightly higher than the levels prevailing at the start of the month.

Stocks Close Higher

Enhancement was shown by 10 of the 20 groups into which are divided the 240 stocks in the *N. Y. Times* monthly yardstick of the stock market. Strongest group was the chemicals, in which the average gain for the nine issues used was 2.889 points. Of those groups not advancing, coppers made the poorest showing, losing an average of 1.308 points for the 15 stocks in the group.

In the last year values of stocks appreciated in four different months, with the net result—a loss of $2,029,862,554, or 14 per cent. Since the beginning of October, 1929, the first full month of the bear market, gains in values were made in 14 of the 39 months to the end of December, 1932. Present level of prices is approximately 25 per cent. of that at the end of September, 1929.

Following table shows the changes in the 20 groups. It is easily seen that the chemical group participated heavily in the appreciation of stocks and aided materially in showing a net gain for the market generally. In November the opposite was true, chemical stocks suffered severe declines and such declines were partially responsible for the net loss for the month in the general list.

Group and Number of Issues	*December* Avr. Net Ch'ge in Points		*Change in Values*	
Amusements (5)	—	.800	—	$7,481,569
Building equip. (9)	—	.167	+	2,685,614
Business equip. (4)	—	.469	—	4,242,626
Chain stores (14)	+	.714	+	27,006,858
Chemicals (9)	+	**2.889**	+	**108,715,501**
Coppers (15)	—	1.308	—	43,483,213
Depart. stores (10)	+	.075	+	1,858,903
Foods (19)	+	.882	+	53,511,906
Leathers (4)	—	.906	—	1,258,962
Mail order (3)	+	.542	+	13,034,678
Motors (15)	+	.300	+	38,171,367
Motor equip. (7)	—	.553	—	1,974,505
Oils (22)	+	.017	—	1,817,409
Public utilities (29)	+	.228	+	199,753,896
Railroads (25)	+	.470	+	83,849,208
Railroad equip. (8)	—	.438	—	8,041,348
Rubber (6)	+	.146	+	1,513,695
Steels (13)	—	.317	—	39,214,803
Sugars (9)	—	.250	—	635,142
Tobaccos (14)	—	.286	—	4,574,731
Aver. and total 240 issues	+	.129	+	$417,377,318

According to the table below, the nine chemical common stocks listed in the *Times* index all showed appreciation in values in December. Conspicuous was the gain of 11¼ points made by Allied. Union Carbide and du Pont also showed large monetary gains because of the large outstanding number of shares.

Allied Chem. & Dye	+11¼	$27,014,490
Comm. Solvents Corp	+ ⅞	2,213,970
Davison Chemical Co	+ ⅛	63,008
Du Pont de Nemours & Co.	+ 3½	38,729,890
Mathieson Alkali Works	+ 2½	1,626,090
Texas Gulf Sulphur	+ 1⅜	3,493,050
Union Carbide & Carbon	+ 3¾	34,580,257
U. S. Industrial Alcohol	+ 2½	934,610
Virginia Carolina Chem	+ ⅛	60,136
Total		$108,715,501

In a similar compilation the *N. Y. Sun* reports the total appreciation of 10 chemical stocks at $118,717,979. The *Sun* lists varies from that of the *Times* by including Air Reduction and Freeport Texas and not Virginia-Carolina.

$368,177,263—Year's Loss

Net gains or losses sustained by the *Times* group of chemical companies in the past 12 months were as follows:

	Net Gain	*Net Loss*
January		$76,262,096
February		67,975,078
March		151,445,913
April		345,560,928
May		82,875,154
June		37,314,238
July	$168,784,625	
August	250,100,073	
September	53,315,053	
October		164,700,937
November		22,958,171
December	108,715,501	
Totals	$580,915,252	$949,092,515

Net Loss for year $368,177,263.

Chemical common stocks increased in value in four months of 1932 and declined in eight. In two months of the year the trend in chemical stocks failed to follow the course of the market generally. In February, the market showed a slight net increase, while the value of chemical stocks went lower, while in September, with the general list off, chemical stocks showed a sizable appreciation in value.

Comparison of end of the year prices of the following 10 chemical stocks with the prices prevailing as the year opened shows five stocks closed out 1932 higher and five lower. Outstanding were the net gains made in Air Reduction (10¾) and in Allied (13⅞). Severe losses, 18 points in du Pont with 11,065,683 shares outstanding and 4¾ points in Union Carbide with 9,221,402 shares are largely responsible for the net loss in the chemical group. This explains why Chemical Markets Average Price for 20 representative chemical common stocks closed in 1932 slightly higher than in 1931, although the net value of the group was off last year from

Price Trend of Chemical Company Stocks

	Dec. 2	*Dec. 9*	*Dec. 16*	*Dec. 23*	*Dec. 30*	*Net Change*
Allied Chemical	70⅞	81⅜	80⅝	76½	83⅛	+12¼
Air Reduction	52	56	58¾	56⅛	60+	+ 8
Anaconda	8⅛	8	6⅜	5¾	7⅛	— 1
Columbian Carbon	23⅝	28½	28	26½	29	+ 5⅜
Com. Sol.	9	10½	10⅛	9⅝	10¼	+ 1¼
DuPont	33⅝	37⅝	38⅛	35¾	37⅜	+ 3¾
Mathieson	13⅛	15⅜	15⅞	14	14½	+ 1⅜
Monsanto	26¼	28+	27¼	26½	27½	+ 1¼
Standard of N. J.	29½	31½	29⅛	29½	30¾	+ 1¼
Texas Gulf	20½	23	22⅞	21¼	22½	+ 2
U. S. I.	23¾	26⅜	25	23½	25¾	+ 2

the 1931 figure. The gains or losses follow:

Stock	1932 Gain or Loss
Air Reduction	+10¾
Allied Chemical	+13⅞
Commercial Solvents	+ 1½
Davison Chemical	— ½
Du Pont de Nemours	—18
Mathieson Alkali	+ 1¼
Texas Gulf Sulphur	— ¼
Union Carbide	— 4¾
U. S. I.	— ⅛
Virginia-Carolina Chemical	+ ¼

The outstanding reason assigned for the special strength in chemical stocks in December was the general belief in financial quarters that the 4th quarter witnessed the largest volume of shipments of chemicals made in 1932 and that the last quarterly earning statements, when issued, will show up very favorably when comparison is made with the other quarterly periods. Further, it is expected that the first three months of 1933 will prove at least as good as the final quarter of 1932.

N. Y. Stock Exchange has authorized listing of $3,500,000 additional American Smelting & Refining 1st mtge. 30-year 5 per cent. gold bonds, series A, due April 1, 1947, on official notice of issuance, making the total amount applied for $57,256,400.

V.-C.'s Purchase Offer

Holders of V.-C.'s prior preference stock who accepted offer of company to take 40 per cent. of their holdings at $75 a share, will be permitted to dispose of approximately 18 per cent. additional stock at the same time.

V.-C. received, prior to Dec. 20, tenders by stockholders of more than 81,000 shares of the 100,100 shares.

The Larkin Co., Buffalo, N. Y., has filed notice with the Secretary of State at Albany of a change in its capital from 200,000 shares of $100 preferred stock and 200,000 shares of common stock of no par value to 50,000 shares of $100 preferred stock and 50,000 shares of common stock of no par value.

McKesson & Robbins stockholders on Dec. 9 voted to change the par value of the authorized and outstanding common stock from shares of no par value to shares of $5 par value.

Dividends and Dates

Name	Div.	Stock Record	Payable
Abbot Labs	$ .50	Dec. 19	Jan. 1
Air Reduction	.75	Dec. 31	Jan. 16
Allied Chem. pf	$1.75	Dec. 9	Jan. 3
Alum. Co. of Am. cum. pf	.75	Dec. 15	Jan. 1
Colgate-Palm-Peet, pf.	$1.50	Dec. 10	Jan. 1
Com. Solvents	.30	Nov. 21	Dec. 31
Devoe & Raynolds 1st pf	$1.75	Dec. 20	Jan. 2
Devoe & Raynolds 2nd pf	$1.75	Dec. 20	Jan. 2
Du Pont deb	$1.50	Jan. 10	Jan. 25
Eastman Kodak, com.	.75	Dec. 5	Jan. 2
Eastman Kodak, pf.	$1.50	Dec. 5	Jan. 2
Glidden Co., pf	$1.75	Dec. 16	Jan. 3
Hercules Powd	.37½	Dec. 13	Dec. 24
Heyden Chem., pf	$1.75	Dec. 22	Jan. 2
Indust. Rayon	.50	Dec. 15	Jan. 1
Int. Nickel, pf.	$1.75	Jan. 2	Feb. 1
Int. Salt Co	.37½	Dec. 15	Jan. 1
Koppers Gas, 6% pf	$1.50	Dec. 12	Jan. 2
Mathieson Alkali	.37½	Dec. 12	Jan. 2
Mathieson Alkali, pf	$1.75	Dec. 12	Jan. 2
McAndrews-Forbes	.25	Dec. 31	Jan. 16
MacAndrews & Forbes pf	$1.50	Dec. 31	Jan. 16
Merck Corp., pf	$2.00	Dec. 17	Jan. 2
Monroe Chem., pf	.87½	Dec. 15	Jan. 2
Monsanto Chem	.31¼	Dec. 10	Jan. 2
Nat'l Dist. Prods., pf	.62½	Dec. 24	Jan. 2
Nat'l Lead	$1.25	Dec. 16	Dec. 31
Nat'l Lead, pf. B	$1.50	Jan. 20	Feb. 1
Penn. Salt Mfg	.75	Dec. 31	Jan. 14
Pitts. Plate Glass	.25	Dec. 10	Jan. 2
Pratt & Lambert	.12½	Dec. 15	Jan. 3
P & G, 8% pf	$2.00	Dec. 23	Jan. 14
Shawinigan W & P	.13	Jan. 21	Feb. 15
Sherwin-Williams, Can. pf	$1.75	Dec. 15	Dec. 31
Union Carbide & Carb	.30	Dec. 2	Jan. 2
United Dyewood, pf	$1.75	Dec. 15	Jan. 3
U. S. Gypsum	.40	Dec. 15	Jan. 2
U. S. Gypsum, pf	$1.75	Dec. 15	Jan. 2
Westvaco Chl., pf	$1.75	Dec. 15	Jan. 2
Will & Baumer Cand. pf	$2.00	Dec. 15	Jan. 3
Young, J. S. & Co.	$1.50	Dec. 23	Jan. 3
Young, J. S. & Co. pf	$1.75	Dec. 23	Jan. 3

Dividend Action

Aluminum Co. of America directors declared dividend of ¾ of 1% on 6% cum. pref. stock, par $100, payable Jan. 1 to holders of record Dec. 15. Similar payment was made on this issue on April 1, July 1 and Oct. 1 last, as compared with regular quarterly distributions of 1½% made previously.

Corn Products declared regular quarterly dividends of 75 cents on common and $1.75 on preferred. Common dividend is payable Jan. 20 and preferred Jan. 16 both to stock of record Jan. 4.

Air Reduction Co. declared regular quarterly dividend of 75 cents, payable Jan. 16 to stock of record Dec. 31.

National Oil Products declared an extra dividend of $1 a share, together with regular semi-annual dividend of $1 a share on the common. It has also declared usual quarterly dividend of $1.75 a share on the preferred. All dividends are payable Jan. 1 to stock of record Dec. 20. Some of the financial news reporting agencies recently erroneously reported that the company had omitted the common and preferred dividends.

Southern Acid & Sulphur resumed dividends when directors declared a dividend of 75 cents per share on the common, no par value, payable Dec. 15, 1932 to holders of record Dec. 10. The last payment was a quarterly of 25 cents per share made on Dec. 15, 1931. Similar distribution was made on Sept. 15 last year, prior to which the stock paid 75 cents per share each quarter.

Cleveland-Cliffs Iron resumed preferred dividend when directors declared dividend of 5 cents per share on the no par $5 cum. pref. stock, payable Dec. 15 to holders of record Dec. 5. Last regular quarterly distribution of $1.25 per share was made on this issue on June 15, 1931.

Federated Metals has declared liquidating dividend of $14 a share on common, payable on or after Dec. 12. This dividend is being paid out of the proceeds from the disposal of the American Smelting & Refining Co. bonds received in the sale of the corporation to the American Smelting & Refining. Metals and metal products in the inventory remain to be sold during the next two years. With the sale of these inventories, stockholders will receive additional liquidating payments.

Seasonal improvement in final quarter which is usually the most profitable for Union Carbide & Carbon, will probably produce profits slightly above the $1,984,918 or 22 cents a share earned or 9,000,743 shares of capital stock in the third quarter. In nine months ended Sept. 30 net profit was $6,221,355, or 69 cents a share.

Over the Counter Prices

	December 31		Range 1932 Bid Price High	Low
J. T. Baker	8	12	9	3
Dixon	25	30	60	20
Merck, pfd	72	76	73	44
Solid C	¾	1¾	3½	¾
Young, J. S., pfd.	80		99	72
Young, J. S., com.	45	58	87	40

Foreign Markets

London	November 30	December 31
British Celanese	7s 10½d	7s 10½d
Celanese	52s 6d	51s 3d
Courtaulds	£1½	£1½
Distillers	54s	55s 3d
Imperial Chemical	23s 6d	25s 6d
Un. Molasses	7s 6d	7s 4½d
Paris		
Kuhlmann	510	546
L'Air Liquide	810	874
Berlin		
I. G. Farm	96	96
Milan		
Italgas	10½	13¾
Montecatini	98½	100
nia Viscosa	142½	200

Chemical Company Incomes in 1931

Corporation returns for 1931 in preliminary report, Bureau of Internal Revenue on statistics of income give following comparison with preceding year:—

	All corporations	Reporting net income	Reporting no net income
Number of returns, 1931	6,841	2,678	*3,774
1930	6,926	3,106	†3,488
Gross income, 1931	$6,257,228,457	$2,873,100,581	$3,384,127,876
1930	9,465,270,575	7,990,307,930	1,474,962,645
Net income, 1931	....	214,203,444	....
1930	....	443,073,396	....
Net loss in prior year, 1931	....	4,680,004	....
1930	....	3,740,575	....
Deficit, 1931	....	....	265,006,810
1930	....	....	114,414,737
Income tax, 1931	....	24,544,196	....
1930	....	52,033,118	....

* 389 inactive corporations reported no income.
† 332 inactive corporations reported no income.

Company Reports

U. S. Smelting's 11 Months Net—$1,797,931

U. S. Smelting, Refining & Mining reports for 11 months ended Nov. 30, estimated net income of $1,797,931 after interest taxes and reserves for depreciation, depletion and amortization, equivalent after dividend requirements on 7% preferred stock, to 51 cents a share (pa $50) on approximately 538,000 average common shares outstanding during the period. This compares with $2,122,108 or $1.01 a share on 559,065 average common shares in corresponding 11 months of 1931.

For year ended Dec. 31, 1932, company estimates net income at $1,975,000 after taxes and charges, equal to 58 cents a share on 538,000 average common shares. For year 1931, company reported net income of $2,504,758 equal to $1.45 a share on 558,090 average common shares and $1.48 a share on 546,893 shares outstanding at close of that year.

Consolidated income account for 11 months ended Nov. 30, 1932, compares as follows:

	1932	*1931*	*1930*	*1929*
Net aft int & tax......	$4,120,973	$4,250,606	$6,017,170	$6,567,315
Depr, depl & amort ...	2,323,042	2,128,498	2,639,419	2,110,867
Net income.........	$1,797,931	$2,122,108	$3,377,751	$4,456,448
Pfd divs.............	1,522,163	1,557,252	1,560,373	1,560,373
Surplus............	$275,768	$564,856	$1,817,378	$2,896,075

Industrial Rayon Reports Loss

Industrial Rayon reports for nine months ended Sept. 30, net loss of $210,928 after taxes, depreciation, interest, etc. This compares with net income of $397,971 equal to $2.74 a share on 144,999 no-par shares of capital stock, in first nine months of 1931. For quarter ended Sept. 30, net loss was $96,115 after taxes and charges, comparing with net loss of $292,461 in preceding quarter and net income of $333,109 equal to $2.30 a share in September quarter of 1931.

Income account for nine months ended Sept. 30, compares as follows:

	1932	*1931*	*1930*	*1929*
Oper profit...........	$372,232	$1,066,295	$2,068,484	$1,527,297
Depreciation..........	574,408	591,239	577,029	263,034
Interest..............	8,752	15,085	33,166	36,055
Fed'l taxes...........	......	62,000	196,200	165,000
Net loss............	$210,928	*$397,971	*$1,262,089	*$1,063,208

Quarter ended Sept. 30:

	1932	*1931*
Operating profit..................................	$86,951	$585,299
Depreciation......................................	180,850	197,508
Interest..	2,216	4,682
Federal taxes.....................................	......	50,000
Net loss..	$96,115	*$333,109

*Net profit.

Smith Agricultural Chemical reports for year ended Oct. 31, net loss after depreciation and other charges of $7,631, compared with net income of $54,796, equivalent after preferred dividends to 75 cents a share on 45,740 common shares in preceding year.

Lehn & Fink reports for ten months ended Oct. 31, net profit of $1,058,158 after depreciation, federal taxes, etc., equal to $2.59 a share on 408,966 no-par shares of stock, excluding shares held in treasury.

Armour & Co., (Ill.) for the fiscal year ended Oct. 29, reported an operating loss of $3,857,565 and a net profit of $1,662,539 after a profit of $5,520,104 resulting from purchase and retirement of its bonds. In the preceding fiscal year, company had an operating loss of $17,339,136. Sales for the fiscal year totaled $468,000,000, against $668,000,000 in the preceding year. Current assets on Oct. 29 were $118,196,445, against $140,098,491 on Oct. 31, 1931, and current liabilities were $11,427,365, against $15,206,438 at the end of the preceding year. Outstanding first mortgage bonds of the company were reduced during the year from $118,433,000 to $96,251,400.

Liquid Carbonic Has a Deficit

Liquid Carbonic and subsidiaries report for fiscal year ended Sept. 30, (certified by independent auditors) shows net loss of $440,529 after depreciation, interest, federal taxes, etc. This compares with net income of $1,085,557 equivalent to $3.17 a share on 342,406 no-par shares of capital stock in preceding fiscal year. Current assets as of Sept. 30, amounted to $8,646,305 and current liabilities were $1,048,446, against $9,759,343 and $1,556,531, respectively, on September 30, 1931. Consolidated income account of Liquid Carbonic and subsidiaries for year ended Sept. 30, compares as follows:

	1932	*1931*	*1930*	*1929*
Net sales............	$6,814,368	$9,858,263	$13,626,530	$12,729,571
Gross profit..........	448,039	2,109,600	3,153,264	2,935,302
Depreciation..........	640,790	612,221	575,743	468,700
Loss...............	$192,751	*$1,497,379	*$2,577,521	*$2,446,602
Other income.........	296,108	336,706	327,531	377,766
Total inc...........	$103,357	$1,834,085	$2,905,052	$2,844,368
Expenses.............	491,648	535,550	575,570	605,709
Foreign ex res........	5,938	31,297	......	......
Interest, etc..........	18,189	50,446	67,572	91,131
Minority int..........	8,749	8,715	......	......
Federal tax...........	19,362	122,520	250,823	244,000
Net loss............	$440,529	*$1,085,557	*$2,011,087	*$1,903,528
Prof sh fd............	......	......	125,000	140,000
Dividends............	427,582	1,027,218	1,336,349	1,164,694
Deficit............	$868,111	†$58,339	†$549,738	†$598,834

*Profit. †Surplus.

Penick & Ford, Ltd., Inc., and subsidiaries reports for quarter ended Sept. 30, profit of $339,187 after depreciation, etc., but before federal taxes, comparing with $143,826 in preceding quarter and $208,491 in September quarter of previous year. For nine months ended Sept. 30, profit before federal taxes was $658,846 against $840,355 in first nine months of 1931. Stock consists of 400,000 no-par shares. Consolidated income account for quarter ended Sept. 30, compares as follows:

	1932	*1931*	*1930*	*1929*
Gross................	$930,419	$789,096	$1,218,305	$1,389,193
Expenses.............	443,764	443,384	656,684	758,669
Depreciation..........	147,468	137,221	158,417	172,449
*Profit............	$339,187	$208,491	$403,204	$458,075

Nine months ended September 30:

	1932	*1931*	*1930*	*1929*
Gross................	$2,445,335	$2,807,346	$3,779,909	$4,075,316
Expenses.............	1,304,047	1,506,011	1,894,969	2,094,759
Depreciation..........	482,442	460,980	480,703	522,162
Interest..............	....	....	....	50,003
*Profit............	$658,846	$840,355	$1,404,237	$1,408,392

*Profit before federal taxes.

Glidden Earnings Higher

Glidden Co. and subsidiaries for fiscal year ended Oct. 31, shows consolidated net profit of $531,435 after interest, depreciation, taxes, etc., but before subsidiary preferred dividends, equivalent after deducting $21,019 subsidiary preferred dividends and $471,086 dividends paid on 7% prior preference stock of Glidden Co., to 6 cents a share on 650,000 no-par shares of common stock. Above net profit includes $260,118 discount on 5½% gold notes purchased and retired and $183,516 excise tax refund, after deducting Canadian exchange, and additional personal property taxes for prior year. In the preceding year, company reported net profit of $201,380, after interest, depreciation, taxes, etc., but before subsidiary preferred dividends, equal to $2.49 a share on 69,000 shares of 7% preference stock. Consolidated income account for year ended Oct. 31, compares as follows:

	1932	*1931*	*1930*	*1929*
Net sales................	$22,259,952	$28,505,172	$36,434,052	$38,319,739
Oper profit..............	1,044,808	1,365,219	1,314,607	4,221,864
Disc on gold notes purchased for retire..............	260,118	....	....	....
†Excise tax refund.........	183,517	....	....	....
Total income..........	$1,488,443	$1,365,219	$1,314,607	$4,221,864
Int. etc. (net)...........	422,514	557,063	669,662	382,728
Depreciation.............	534,494	606,776	633,580	520,526
Federal tax..............	....	....	....	359,500
Net profit............	$531,435	$201,380	$11,365	$2,959,110
Pfd divs of subs..........	21,019	29,130	30,000	17,500
Pr pfd divs..............	471,086	506,138	519,841	505,713
Com div (cash)...........	....	....	1,240,763	1,137,147
Surplus...............	*$39,330	*$333,888	*$1,779,239	$1,298,750

*Deficit. †After deducting Canadian exchange and additional personal property taxes for prior year.

The Industry's Securities

1932 December Last	December High	December Low	1932 High	1932 Low	1931 High	1931 Low	Sales In December	Sales During 1932	Stocks	Par $	Shares Listed	An. Rate		Earnings $-per share-$ 1931	1930
NEW YORK STOCK EXCHANGE															
60¼	60⅞	51	63½	30⅞	109⅜	47⅜	59,500	1,129,700	Air Reduction	No	841,288	$3.00		4.54	6.32
82½	84¼	70⅜	88¼	42½	182¾	64	347,955	4,774,555	Allied Chem. & Dye	No	2,401,000	6.00		6.74	9.77
119½	120	116	120†	96½	133½	100	2,200	25,800	7% cum. pfd.	100	393,000	7.00			
9½	9	7½	15½	3½	29¾	5⅛	10,900	15,800	Amer. Agric. Chem.	100	333,000		Yr. Je. '30		Nil
21	21¾	17¾	27	11	14⅞	5	19,600	348,400	Amer. Com. Alc. (new)	20	375,000				d1.27
10½	10⅞	10⅛	15½	7	18	10⅛	3,600	43,000	Archer Dan. Midland	No	550,000	1.00	Yr. Aug. 30		1.68
7⅝	10¾	7	25½	7*	54	18	7,664	45,164	Atlas Powder Co.	No	261,438			.59	2.67
61¼	65	61¼	79½	45½	99⅞	77¼	742	6,330	6% cum. pfd.	100	96,000	6.00			
28	29⅞	23	41⅞	13½	111⅛	32	34,200	887,900	Columbian Carbon	No	538,420	2.00		3.02	5.04
10⅛	10⅞	9	13¾	3½	21½	6⅜	93,400	1,913,900	Comm. Solvents	No	2,530,000	.60		.83	1.07
53⅛	54¾	46½	55⅜	24¾	86⅝	36½	97,300	1,924,170	Corn Products	25	2,530,000	3.00		3.54	4.82
135⅜	139⅞	134	140	99½	152¼	116	690	9,350	7% cum. pfd.	100	250,000	7.00			
3½	4	2⅞	9¼	1	23	3½	9,300	193,200	Davison Chem. Co.	No	504,000		Yr. Je. '30		4.00
37½	39¾	33¼	59¾	22	107	50¾	353,123	6,854,711	DuPont de Nemours	20	11,008,512	2.00		4.29	4.67
105	105	100¼	105⅛	80¾	185¾	91⅛	2,900	53,013	6% cum. deb.	100	1,098,831	6.00			
54¾	58⅞	48⅝	87¼	35¼	185¾	77	62,700	1,505,448	Eastman Kodak	No	2,261,000	3.00		5.78	8.84
119	119½	117	125	99	135	103	250	2,415	6% cum. pfd.	100	62,000	6.00			
25	25⅞	21⅛	28⅝	10	43½	13½	87,700	861,025	Freeport Texas Co.	No	730,000	2.00		3.26	w4.77
16⅝	18	16⅛	29½	13⅞	43¼	13¼	600	27,100	Hercules Powder Co.	No	606,234	1.50		1.04	2.61
82	90¼	78	95	70½	119½	95	330	3,020	7% cum. pfd.	100	114,241	7.00			
1¼	1½	1	3½	¼	5¼	1	2,500	29,100	Intern. Agric.	No	450,000		Yr. Je. '30		1.68
4¼	5⅛	4¼	15	3¾	51¼	4½	1,100	10,000	7% cum. prior pfd.	100	100,000	7.00	Yr. Je. '30		14.58
8¼	8⅜	7¼	12½	3½	20⅛	7	157,200	3,489,784	Intern. Nickel	No	14,584,000			.22	.67
9	9	9	11	8	16½	9	300	17,100	Kellogg (Spencer)	No	598,000	.60			h1.14
14¼	16⅜	13¼	22	9	55⅛	13½	17,600	231,060	Liquid Carbonic Corp.	No	342,000			2.96	5.22
16	16⅜	13⅛	20⅞	9	31½	12	9,800	240,700	Mathieson Alkali	No	650,426	1.50		1.88	2.96
100	100	100	105	89¾	125⅜	106½	30	1,120	7% cum. pfd.	100	24,610	7.00			
28¼	29⅞	25	30¾	13⅜	29	16¼	6,400	128,369	Monsanto Chem.	No	416,000	1.25		2.98	1.73
19	20¾	16⅛	27¼	13	36⅜	16	18,700	554,700	National Dist. Prod. cts. (new)	No	252,000			—	1.23
57½	62¼	57½	92	45	132	78½	1,000	22,800	National Lead	100	310,000	5.00			7.58
106	110	101	125	87	143	111	230	13,242	7% cum. "A" pfd.	100	244,000	7.00			
80¼	83	80	105	61	120	102	380	4,250	6% cum. "B" pfd.	100	103,000	6.00			
1½	2¾	1¼	4⅜	1	9½	2	20,900	74,900	Tenn. Corporation	No	857,000	1.00			1.21
22½	23⅞	20	26¾	12	55¾	19½	85,200	919,935	Texas Gulf Sulphur	No	2,540,000	2.00		3.52	5.50
26¼	27	22	36⅜	15½	72	27⅛	184,512	3,849,046	Union Carbide & Carb.	No	9,001,000	1.20		2.00	3.12
14	14⅜	9¾	18	6⅝	28⅜	6⅛	33,100	223,225	United Carbon Co.	No	398,000			—	1.43
26	27⅜	23⅛	36¼	13¼	77⅜	20⅜	32,000	1,250,790	U. S. Ind. Alc. Co.	No	373,846			—	z2.96
12½	13¼	10⅝	23¾	5¼	76¾	11	26,300	1,195,700	Vanadium Corp. of Amer.	No	378,367				2.95
1	1	⅝	2⅜	½	3¼	½	3,400	64,700	Virginia Caro. Chem.	No	487,000		Yr. Je. '30		Nil
4¾	6	4½	11¼	3⅛	17	2¾	2,000	30,400	6% cum. part. pfd.	100	213,000		Yr. Je. '30		2.63
50	64	50	69¾	20	72	35	3,000	27,800	7% cum. prior pfd.	100	145,000		Yr. Je. '30		11.96
6¼	7	5	12⅜	1	40	7⅜	2,600	46,400	Westvaco Chlorine Prod.	No		1.00		1.79	2.51
NEW YORK CURB															
4½	4¾	3¼	8½	1⅝	12⅜	2⅜	45,014	467,785	Amer. Cyanamid "B"	No	2,404,000			.21	
⅛	316	⅛	⅞	⅛	15	⅜	3,200	28,800	Anglo-Chilean Nitrate	No	1,757,000		Yr. Je. '30		Nil
1¼	1¼	1¼	2⅛	¾	2⅜	⅞	200	12,700	Brit. Celanese Am. Rcts.	2.43	2,806,000				
40	49	35	55	8	81½	16½	4,450	14,100	Celanese 7% cum. part. 1st pfd.	100	148,000	7.00			
61	64¼	35	64¼	17	65	25	1,475	12,675	" 7% cum. prior pfd.	100	115,000	7.00			
...	2	1⅛	5⅜	1⅛	...	...	1,150	7,750	Celluloid Corp.	No	195,000				
...	5⅛	5	6⅞	4½	9	5⅜	300	2,400	Courtaulds, Ltd.	1£					
32½	32½	32½	39	21⅛	51	30½	100	4,800	Dow Chemical	No	630,000	2.00			3.44
...	1	½	1½	¼			2,900	14,800	Duval Texas Sulphur	No	500,000				
9⅝	9¾	9½	...	...	13	6½	300	3,500	Heyden Chemical Corp.	10	150,000	1.00			
...	...	...	2⅞	2¼	3⅛	2⅜		100	Imperial Chem. Ind.	1£				1.21	
8½	8⅝	7½	20⅞	6¼	60	20	1,300	16,900	Shawinigan W. & P.	No	2,178,000	1.00			
3⅝	⅝	½	3	½	12	⅜	8,900	105,800	Silica Gel Corp.	No	600,000				
CLEVELAND STOCK EXCHANGE															
...	...	...	25	21¾	...	...		264	Cleve-Cliffs Iron $5 pfd.	No	498,000	5.00		—	11.42
31	32	30	40	21½	51½	30	759	10,222	Dow Chemical Co.	No	630,000	2.00			3.44
99	99	98	...	...			135		Dow Chemical Co., pfd.	100	3,000,000	7.00			
115	115	115	...	...			63		National Carbon, pfd.	100	5,600,000	7.00			
PHILADELPHIA STOCK EXCHANGE															
27	29¼	25¼	40	19⅞	75	37½	1,250	1,325	Pennsylvania Salt	50	150,000	3.00	Yr. Je. '30		7.97

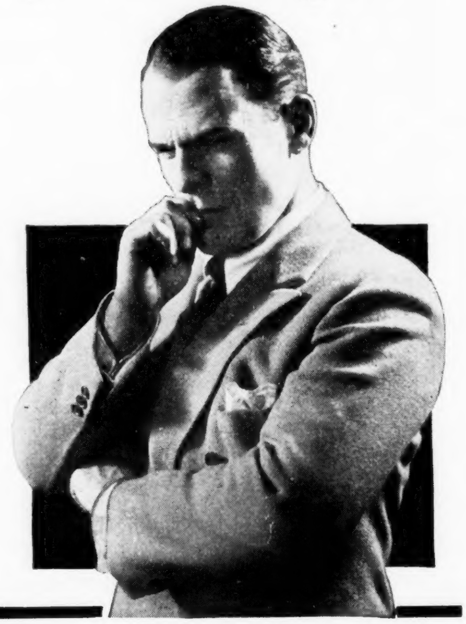
1932 December Last	December High	December Low	1932 High	1932 Low	1931 High	1931 Low	Sales In December	Sales During 1932	Bonds	Date Due	Int. %	Int. Period	Outstanding $
NEW YORK STOCK EXCHANGE													
75	75	70	80	62	99	69½	18	330	Amer. Cyan. deb. 5s.	1942	5	A. O.	4,554,000
78	78	69¾	80	54¼	102	52	383	3,394	Amer. I. G. Chem. conv. 5½s.	1949	5½	M. N.	29,933,000
2⅛	4½	2⅛	18	1	63½	7½	263	850	Anglo-Chilean s. f. deb. 7s.	1945	7	M. N.	14,600,000
43½	46	40⅛	60	34½	104	59	15	355	By-Products Coke Corp. 1st 5½s "A"	1945	5½	M. N.	6,629,000
103½	104	103½	104⅞	100⅝	105⅜	100	16	296	Corn Prod. Refin. 1st s. f. 5s.	1934	5	M. N.	1,822,000
45½	46	45	54⅞	32			10	447	Int. Agric. Corp. 1st coll. tr. stamped to 1942	1942	5½		
3⅞	4½	2	15¼	¼	75½	6	620	3,924	Lautaro Nitrate conv. 6s.	1954	6	J. J.	32,000,000
97	97¾	94	97¾	67			94		Montecatini Min. & Agric. deb 7s with warrants	1937	7	J. J.	8,188,000
58¾	59	49	59	17			39		Ruhr chemical s. f. 6s.	1948	6	A. O.	3,578,000
88½	88	83	90	66	103	80	34	947	Solvay Am. Invest. 5% notes	1942	5	M. S.	15,000,000
55	57	55	66	39	99	45	60	266	Tenn. Corporation deb. 6s. "B"	1944	6	M. S.	3,308,000
46	47	42	75	30			75	2,255	Vanadium Corp. conv. 5s.	1941	5	A. O.	5,000,000
NEW YORK CURB													
57½	61	56½	76	55	98⅜	56	323,000	3,689,000	Shawinigan W. & P. 4½s. "A"	1967	4½	A. O.	35,000,000
57¼	60¼	57¼	76	55	98½	58	90,000	1,151,000	4½s., series "B"	1968	4½	M. N.	16,108,000
102¾	103	102⅜	103⅛	99	104½	95	6,000	693,000	Westvaco Chlorine Prod. 5½s.	1937	5½	M. S.	1,992,000

h 11 mos. ending Aug. 30; w 13 mos.; z Before inventory adjustment; *New Low; †New High

"I Wonder if I can Ship in Bags?"

Very likely you *can*—and save a lot of money doing it! A great variety of products are now being shipped, efficiently and economically, in Bemis Waterproof Bags. Their initial cost is low—they're easy to handle—they require little storage space—and, because they are light in weight, they lower freight costs considerably. May we lay before you our entire story? It will interest and convince you.

BEMIS BRO. BAG CO.
407 Poplar Street · · · St. Louis, Mo.
5104 Second Avenue · · Brooklyn, N. Y.



BEMIS WATERPROOF BAGS

014

KOPPERS

Uniform and reliable coal tar products for the chemical consuming industries. Remarkably free from impurities . . . with excellent color and odor. Koppers supervision of mining, carbonizing, distilling and refining processes insures superior quality. Samples and technical information on request.

REFINED COAL TAR PRODUCTS

BENZOL (All Grades)
TOLUOL (Industrial and Nitration)
XYLOL (10° and Industrial)
SOLVENT NAPHTHA
PHENOL (80% & 90% Purity)
CRESOL (U.S.P., Resin and Special Fractions)
CRESYLIC ACID (98% Pale . . . Low boiling)
NAPHTHALENE

KOPPERS Cresylic Acid

is of interest to
Resin, Plasticizer, Soap, Insecticide and Disinfectant Manufacturers
because

I—Guaranteed to contain not less than 98% tar acids.
II—Prepared under a control which insures chemical constituents as specified uniform in every shipment.
III—Available in any required distillation range.
IV—Satisfactory with respect to odor and color.
V—Exceptionally low impurity contents.

KOPPERS PRODUCTS COMPANY
KOPPERS BUILDING, PITTSBURGH, PA.
CHICAGO NEW YORK ST. LOUIS PROVIDENCE BOSTON
SAN FRANCISCO BIRMINGHAM NEW HAVEN

Chemical Exports and Imports

U. S. Chemical Export Figures for October

ARTICLES	OCTOBER 1931 Quantity	OCTOBER 1931 Dollars	OCTOBER 1932 Quantity	OCTOBER 1932 Dollars
GROUP 8.				
COAL-TAR PRODUCTS		719, 802		775, 848
Benzol ... galls	2, 057, 066	351, 880	976, 582	152, 166
Crude coal tar ... bbls [1]	665	3, 412	30, 253	74, 346
Coal-tar pitch ... tons	122	2, 047	17, 994	186, 086
Creosote oil ... galls	28, 632	4, 433	2, 312	931
Coal-tar colors, dyes, stains, and color lakes ... lbs	1, 013, 569	315, 559	924, 434	294, 760
Other coal-tar products, exclusive of medicinals ... lbs	304, 238	42, 471	484, 710	67, 559
INDUSTRIAL CHEMICAL SPECIALTIES		908, 156		875, 999
Nicotine sulphate (40% basis) ... lbs	2, 000	2, 262	2, 985	2, 236
Lead arsenate ... lbs	94, 156	8, 801	65, 314	5, 348
Calcium arsenate ... lbs	123, 926	4, 762	383, 738	12, 858
Other agricultural insecticides, fungicides, and similar preparations, and materials ... lbs	346, 975	31, 662	507, 936	56, 535
Household insecticides and exterminators ... lbs	242, 401	65, 739		
Liquid ... lbs			249, 760	80, 815
Powdered or paste ... lbs			24, 935	5, 683
Household disinfectants, deodorants, germicides, and similar preparations ... lbs	148, 812	21, 327	49, 159	5, 488
Baking powder ... lbs	363, 580	110, 207	219, 926	53, 285
Petroleum jelly ... lbs	1, 177, 531	104, 850	980, 970	58, 651
Tobacco extracts ... lbs	81, 218	15, 298	223, 438	32, 369
Dextrine or British gum ... lbs	839, 754	33, 044	777, 057	29, 916
Rubber compounding agents (accelerators, retarders, etc.) ... lbs	162, 351	85, 983	106, 365	56, 540
Cementing preparations, for repairing, sealing, and adhesive use ... lbs	328, 546	69, 403	179, 768	33, 542
Textile specialty compounds ... lbs	433, 153	16, 272	186, 752	18, 200
Water softeners, purifiers, boiler, and feed-water compounds ... lbs	70, 449	8, 678	198, 345	29, 259
Metal-working compounds ... lbs	77, 740	9, 954	67, 062	14, 288
Dry-cleaning preparations and stain removers ... lbs	4, 014	887	4, 135	883
Other industrial specialty cleaning and washing compounds (exclusive of soap) ... lbs	146, 816	14, 837	66, 462	6, 842
Polishes—				
Metal and stove polishes ... lbs	62, 436	9, 889	40, 619	6, 145
Shoe polishes and shoe cleaners ... lbs	82, 501	26, 404	80, 751	19, 998
INDUSTRIAL CHEMICALS		1, 393, 954		1, 406, 360
Acids and anhydrides—				
Organic (exclusive of coal-tar acids) ... lbs	41, 145	6, 596	28, 724	4, 329
Inorganic—				
Nitric ... lbs	19, 540	2, 416	7, 912	843
Sulphuric ... lbs	182, 849	4, 864	157, 769	2, 899
Hydrochloric (muriatic) ... lbs	191, 975	4, 816	151, 862	3, 091
Boric (boracic) ... lbs	93, 613	6, 146	132, 325	6, 493
Other inorganic acids and anhydrides ... lbs	540, 218	22, 846	303, 405	16, 264
Alcohols—				
Methanol ... galls	80, 065	27, 905	79, 714	33, 270
Glycerol (glycerin) ... lbs	22, 386	2, 977	23, 393	2, 225
Butanol (butyl alcohol) ... lbs	34, 204	4, 409	203, 040	14, 885
Other alcohols ... lbs	33, 987	4, 207	110, 498	7, 630
Acetone ... lbs	479, 602	30, 179	493, 431	32, 054
Carbon tetrachloride ... lbs	23, 930	1, 404	70, 399	3, 727
Carbon bisulphide ... lbs	265, 240	14, 439	204, 838	9, 839
Formaldehyde (formalin) ... lbs	189, 785	10, 757	149, 116	6, 858
Ethylene compounds ... lbs	51, 742	7, 755	2, 166, 442	268, 734
Citrate of lime ... lbs	220, 740	22, 700	100, 682	6, 500
Other synthetic organic products ... lbs	197, 130	37, 435	406, 532	57, 075
Nitro or aceto cellulose solutions, collodion, etc ... lbs	246, 607	60, 476	219, 672	49, 378
Ammonium compounds (except sulphate, phosphate, and anhydrous ammonia) ... lbs	62, 184	4, 073	65, 016	3, 206
Aluminum sulphate ... lbs	6, 145, 277	56, 112	4, 669, 525	51, 001
Other aluminum compounds ... lbs	86, 542	8, 811	57, 327	5, 464
Calcium compounds—				
Carbide ... lbs	181, 036	7, 575	86, 008	4, 470
Chlorinated lime (bleaching powder) ... lbs	129, 144	4, 469	255, 318	6, 995
Chloride ... lbs	925, 491	11, 840	481, 856	4, 968
Other, except arsenate, cyanide, and citrate ... lbs	59, 665	3, 379	51, 543	8, 225
Copper sulphate (blue vitriol) ... lbs	295, 554	10, 005	513, 452	12, 600
Hydrogen peroxide (or dioxide) ... lbs	88, 965	11, 109	109, 072	17, 220
Potassium compounds (not fertilizers) ... lbs	156, 946	35, 649	157, 622	21, 563

ARTICLES	OCTOBER 1931 Quantity	OCTOBER 1931 Dollars	OCTOBER 1932 Quantity	OCTOBER 1932 Dollars
GROUP 8.—Continued.				
INDUSTRIAL CHEMICALS—Continued				
Sodium compounds ... lbs	34, 728, 233	665, 928	33, 471, 029	561, 418
Bichromate and chromate ... lbs	436, 528	28, 012	491, 366	25, 277
Cyanide ... lbs	64, 917	9, 166	108, 575	13, 961
Borate (borax) ... lbs	9, 078, 087	171, 970	14, 045, 319	194, 931
Silicate (water glass) ... lbs	4, 341, 544	42, 630	4, 169, 213	32, 523
Soda ash ... lbs	3, 898, 930	58, 347	2, 428, 889	41, 501
Sal soda ... lbs	738, 884	11, 102	479, 628	7, 142
Bicarbonate (acid, soda, or baking soda) ... lbs	1, 387, 653	24, 365	1, 220, 667	24, 207
Sulphate ... lbs	2, 071, 792	14, 086	561, 854	2, 128
Bisulphate (niter cake) ... lbs	1, 550, 534	6, 950	11, 863	374
Hydroxide (caustic soda) in drums ... lbs	10, 079, 817	249, 028	8, 810, 468	166, 365
Sulphide ... lbs	47, 581	1, 122	10, 544	372
Flourides ... lbs	582	150	4, 500	351
Sodium phosphate (mono, di, or tri) ... lbs	548, 570	17, 302	479, 940	16, 101
Other sodium compounds ... lbs	482, 814	31, 698	648, 203	36, 185
Tin compounds ... lbs	9, 776	2, 460	40, 147	6, 882
Zinc compounds ... lbs	143, 782	5, 227	20, 415	2, 390
Gases, compressed, liquefied, and solidified—				
Ammonia anhydrous ... lbs	61, 406	11, 205	52, 830	6, 765
Chlorine ... lbs	615, 691	17, 710	503, 217	11, 973
Other gases, n. e. s ... lbs	333, 987	47, 995	151, 415	25, 210
Other industrial chemicals		218, 080		129, 916
PIGMENTS, PAINTS, AND VARNISHES		1, 080, 216		897, 285
Mineral-earth pigments—				
Ocher, umber, sienna, and other forms of iron oxide for paints ... lbs	1, 935, 614	26, 897	192, 517	5, 899
Other mineral-earth pigments (whiting, barytes, etc.) ... lbs	726, 338	12, 842	439, 462	4, 736
Chemical pigments—				
Zinc oxide ... lbs	756, 958	48, 100	147, 898	12, 546
Lithopone ... lbs	462, 135	21, 050	561, 638	25, 404
Bone black and lamp black ... lbs	91, 166	6, 140	53, 053	3, 664
Carbon black or gas black ... lbs	8, 482, 465	425, 044	11, 338, 757	464, 313
Red lead, litharge, and orange mineral ... lbs	477, 690	28, 430		
Red lead ... lbs			91, 057	5, 016
Litharge ... lbs			205, 338	8, 105
White lead ... lbs	957, 348	55, 088		
Dry ... lbs			177, 361	7, 501
In oil ... lbs			72, 962	4, 870
Other chemical pigments ... lbs	327, 907	41, 441	318, 936	44, 796
Bituminous paints, liquid and plastic		34, 136		12, 791
Paste paint ... lbs	330, 628	42, 452	125, 628	16, 580
Kalsomine or cold-water paints, dry ... lbs	483, 283	27, 610	518, 672	24, 514
Nitrocellulose (pyroxylin) lacquers—				
Pigmented ... galls	16, 162	50, 023	17, 842	47, 898
Clear ... galls	4, 045	9, 519	5, 663	11, 586
Thinners for nitrocellulose lacquers ... galls	13, 231	17, 863	17, 912	18, 415
Ready-mixed paints, stains, and enamels ... galls	100, 381	196, 817	73, 867	148, 402
Varnishes (oil or spirit, and liquid dryers) ... galls	24, 246	33, 564	26, 639	29, 355
Paint and varnish removers ... galls	2, 148	3, 200	802	894
FERTILIZERS AND FERTILIZER MATERIALS ... tons	94, 416	1, 019, 312	67, 268	830, 561
Nitrogenous fertilizer materials—				
Ammonium sulphate ... tons	4, 871	154, 215	271	5, 508
Other nitrogenous chemical materials ... tons	7, 552	231, 993	19, 098	466, 558
Nitrogenous organic waste materials ... tons	1, 028	21, 320	1, 310	23, 994
Phosphatic fertilizer materials—				
Phosphate rock—				
High-grade hard rock ... tons	8, 877	46, 485	11, 804	78, 992
Land pebble ... tons	54, 862	228, 765	25, 590	127, 687
Superphosphate ... tons	11, 088	127, 102	6, 746	53, 048
Other phosphate materials ... tons	287	14, 703	64	3, 865
Potassic fertilizer materials—				
Potassium chloride or muriate ... tons	298	12, 052	100	3, 900
Other potash fertilizer ... tons	3	169		
Concentrated chemical fertilizers—				
Nitrogenous phosphatic types ... tons	5, 108	164, 407	1, 535	51, 944
Nitrogenous potassic types ... tons	20	800		
Nitrogenous phosphatic potassic types ... tons	121	2, 818	700	13, 256
Prepared fertilizer mixtures ... tons	300	14, 483	50	1, 809

U. S. Chemical Export Figures for October *(Continued)*

ARTICLES	OCTOBER			
	1931		1932	
EXPLOSIVES, FUSES, ETC.		87,154		74,640
Explosives—				
Smokeless powder...lbs..	3,063	1,636	12,367	7,093
Other gun powder...lbs..	6,900	2,050	4,349	1,222
Blasting powder...lbs..	15,682	985	3,020	409
Dynamite...lbs..	270,072	38,482	201,800	26,496
Other explosives...lbs..			12,555	23,189
Fuses and blasting caps—				
Safety fuses...lin. ft..	7,875,600	39,263	2,416,885	12,212
Blasting caps...No..	293,100	4,738	198,200	4,019
SOAP AND TOILET PREPARATIONS		977,299		512,442

ARTICLES	OCTOBER			
	1931		1932	
Soap—				
Medicated...lbs..	29,570	16,186	18,220	11,313
Toilet or fancy...lbs..	208,727	46,733	414,069	60,177
Laundry...lbs..	2,791,293	176,290	1,919,239	101,374
Powdered or flaked...lbs..	101,435	7,463	95,036	6,670
Shaving creams...lbs..	36,132	15,609	67,641	16,868
Shaving cakes, powders, and sticks...lbs..	68,638	16,631	26,916	8,865
Other soap...lbs..	76,310	10,527	54,776	6,787
Scouring soaps and scouring powders...lbs..	572,379	39,420		
Scouring soaps, bricks, pastes, and powders...lbs..			246,551	20,113
Household washing powders...lbs..			36,698	2,171

U. S. Chemical Import Figures for October

ARTICLES	OCTOBER			
	1931		1932	
	Quantity	*Dollars*	*Quantity*	*Dollars*
COAL-TAR PRODUCTS		1,037,328		892,760
Dead or creosote oil, free...galls..	4,621,206	439,335	2,750,999	265,939
All other crudes, free		52,944		50,047
Acids, dut...lbs..			97,624	5,432
All other intermediates, dut...lbs..	90,149	79,529	59,783	48,024
Colors, dyes, stains, color acids, and color bases, n. e. s., dut...lbs..	346,613	409,972	485,119	500,339
Coal-tar medicinals, dut...lbs..	6,287	29,791	1,725	7,452
Other finished coal-tar products, dut...lbs..	7,869	25,757	5,912	15,527
MEDICINAL AND PHARMACEUTICAL PREPARATIONS		243,244		120,742
Quinine sulphate, free...ozs..	90,000	25,380	52,000	17,310
Other quinine and other alkaloids and salts from cinchona bark, free...ozs..	14,200	5,001	14,832	5,612
Other alkaloids, salts, and derivatives, dut		7,741		4,507
Antitoxins, serums, vaccines, etc., and blistering beetles, free		1,111		42
Menthol, dut...lbs..	25,416	78,399	4,200	6,738
Santonin and salts, free...lbs..	8	831	11	447
Other medicinal, dut		7,015		2,841
All other preparations, n. e. s., dut..		117,766		83,245
INDUSTRIAL CHEMICALS		1,407,017		943,277
Acetylene, butylene, ethylene, and propylene derivatives, dut...lbs..	9,508	1,519	13,735	3,548
Acids and anhydrides—				
Acetic or pyroligneous, dut...lbs..	698,360	48,885	2,792,347	173,457
Arsenious (white arsenic), free..lbs..	659,550	17,461	624,074	17,648
Formic, dut...lbs..	44,171	2,469	7,165	442
Oxalic, dut...lbs..	35,674	1,870	21,495	826
Sulphuric (oil of vitriol), free...lbs..	271,620	2,527	126,950	1,080
Tartaric, dut...lbs..	169,144	33,681	50,000	7,194
All other, free...lbs..	40	37	266	156
All other, dut...lbs..	81,820	19,179	116,883	18,261
Alcohols, including fusel oil, dut		672		2,268
Ammonium compounds, n. e. s.—				
Chloride (muriate), dut...lbs..	320,670	9,490	698,548	17,682
Nitrate, dut...lbs..	341,528	9,575	509,932	11,123
All other, dut...lbs..	21,472	1,407	12,500	774
Barium compounds, dut...lbs..	267,682	4,383	66,704	1,702
Calcium compounds, dut...lbs..	40,000	1,333	81,680	1,053
Cellulose products, n. e. s.—				
Acetate, dut...lbs..	9,029	7,409	1,362	780
All other—				
Sheets, more than 3/1,000 inch thick, and other forms, dut..lbs..	10,741	9,303	16,390	21,949
Sheets and strips, more than 1 inch wide, not over 3/1,000 inch thick, dut...lbs..	860	597	549	661
Cobalt oxides, dut...lbs..	16,806	18,201	16,211	15,599
Copper sulphate, free...lbs..	66,835	2,379		
Copper sulphate, gross weight...lbs..				
Copper sulphate, copper content, dut..lbs..				
Glycerin, crude, dut...lbs..	1,053,544	50,376	531,814	19,792
Glycerin, refined, dut...lbs..	83,505	6,143	375,547	21,903
Iodine, crude, free...lbs..	19,902	66,237	500	1,012
Lime, chlorinated, or bleaching powder, dut...lbs..	154,657	5,229	151,059	3,404
Magnesium compounds, dut...lbs..	1,486,067	15,561	911,655	11,555
Potassium compounds, n. e. s.—				
Argols, tartar, and wine lees, free...lbs..	1,718,822	130,391	1,481,358	73,467
Carbonate, dut...lbs..	1,737,115	72,247	840,714	34,022
Chlorate and perchlorate, dut..lbs..	1,438,047	49,791	173,624	8,515
Cream of tartar, dut...lbs..			9,980	1,057
Cyanide, free...lbs..	3,141	1,109	2,009	559
Hydroxide (caustic potash), dut...lbs..	803,071	38,585	316,632	15,132
Nitrate, crude (saltpeter), free...tons..	4,215	179,871	740	39,449
Other potassium compounds, n. e. s., dut...lbs..	844,664	38,767	113,072	8,723

ARTICLES	OCTOBER			
	1931		1932	
Sodium compounds, n. e. s.—				
Chlorate, dut...lbs..				
Sulphate (salt cake), free...lbs..	6,178,843	31,367	8,279,718	42,198
Cyanide, free...lbs..	1,667,008	170,781	1,683,896	164,485
Ferrocyanide (yellow prussiate), dut...lbs..	22,013	1,956	41,405	21,184
Nitrite, dut...lbs..	1,158	132		
Phosphate (except pyrophosphate), dut...lbs..	99,635	1,459	17,776	408
Other sodium compounds, n. e. s., free...lbs..	20,000	95	143	17
Other sodium compounds, n. e. s., dut		42,288		56,020
Radium salts, free...grains..	8	28,574	1	3,000
Other industrial chemicals, free		121,930		28,759
Other industrial chemicals, dut		163,751		92,413
PIGMENTS, PAINTS, AND VARNISHES		148,740		109,759
Mineral earth pigments—				
Iron oxide and iron hydroxide, dut...lbs..	1,080,861	26,933	789,077	14,519
Ochers and siennas, dut...lbs..	758,474	10,280	629,741	7,118
Other mineral earth pigments, dut..		6,643		6,437
Lithopone and zinc pigments, n. e. s., dut...lbs..	1,142,274	40,383	929,512	26,084
Zinc oxide and leaded zinc oxide, dut...lbs..	180,259	11,787	504,335	22,331
Other chemical pigments, dut..lbs..	652,194	29,636	149,081	10,162
Paints, stains, and enamels, dut		20,690		19,513
Varnishes, dut...galls..	803	2,388	3,265	3,595
FERTILIZERS AND MATERIALS...tons..	117,704	3,372,614	90,657	1,772,242
Nitrogenous—				
Ammonium sulphate, free...tons..	18,616	448,361	28,663	420,107
Ammonium-sulphate-nitrate, free...tons..				
Calcium cyanamide, or lime nitrogen, free...tons..	3,468	89,156	4,686	129,870
Calcium nitrate, free...tons..			503	12,098
Guano, free...tons..	141	4,133	7,395	163,413
Dried blood, free...tons..	946	24,310	75	1,461
Sodium nitrate, free...tons..	33,968	1,073,142	13	610
Urea and calurea, free...tons..	403	33,712	329	29,413
Other nitrogenous, free...tons..	1,244	30,014	218	4,169
Phosphates—				
Bone ash, dust, and meal, and animal carbon fertilizers, free..tons..	2,957	49,780	2,169	34,494
Other phosphates, free...tons..	374	8,160	7,337	34,675
Potash fertilizers—				
Chloride, crude, free...tons..	24,649	873,163	13,601	482,843
Kainite, free...tons..	4,529	35,512	1,307	10,016
Manure salts, free...tons..	13,011	189,915	11,372	111,883
Sulphate, crude, free...tons..	7,804	396,236	3,716	153,337
Other potash-bearing substances, free...tons..	78	515	4	21
Fertilizers, compounded or combined, containing nitrogen, phosphoric acid, and potash, free..tons..	932	53,659	1,094	56,907
All other, free...tons..	4,584	62,846	8,175	126,925
EXPLOSIVES		51,838		14,234
Powder and other explosives, n. e. s., free...lbs..	593	25,751		
Powder and other explosives, n. e. s., dut		20		13
Firecrackers, dut...lbs..	185,077	25,076	119,947	12,332
Fireworks and ammunition, dut		991		1,889
SOAP AND TOILET PREPARATIONS		319,622		157,287
Soap—				
Castile, dut...lbs..	368,288	31,668	83,918	6,051
Toilet, dut...lbs..	190,435	54,126	69,372	16,649
All other, dut...lbs..	132,203	14,506	241,013	16,378
Perfume materials, free...lbs..			314	17,433
Perfume materials, dut		38,825		42,854
Perfumery, bay rum, and toilet water, dut		140,431		34,749
Bath salts, dut...lbs..	1,218	188	3,226	450

Compiled from Monthly Summary of Foreign Trade of the United States, of the Dept. of Commerce

The Trend of Prices

State of Business

Most sections of the country reported a fairly satisfactory volume of retail holiday business, although the dollar total was off quite substantially from the figure for 1931. As is usual in December, wholesale trade was quiet.

Declines in activity were recorded in nearly all of the so-called heavy industries. Whether the contractions were more or less than normal is difficult to determine. One important exception was the automobile industry. The *Times* adjusted index of automobile production reached its highest peak for the year in the second and third weeks of December. With the official opening of the 1933 season about to get under way in N. Y. City, producers expect to show even higher totals for January.

Despite the improvement in demand from the automotive centers the steel mills were not as active in December as they were in the previous month. Leading factors in the trade, however, appear to be quite confident that an upward swing will start with the end of the holiday season. Estimates vary as to the actual rate of operations which prevailed during the last weeks of December, but there seems to be little doubt that the two final weeks of 1932 witnessed the lowest production record for many years.

In the textile, glass, paint and varnish, lacquer, paper, and leather industries seasonal contraction of manufacturing activity took place. In all lines the desire to close the year with small stock inventories prevented any improvement from taking place. Yet, strangely enough, one of the bright sides to the picture was the more than better seasonal showing made by carloadings. Railroad traffic and earnings, generally speaking, have been showing signs of definite improvement.

Business Activity

The *N. Y. Times* index of business

activity showed signs of recovery in the first two weeks of December, reaching a figure equal to the rate prevailing late in April. In the last part of the month some decline was recorded. A glance at the accompanying chart shows, however, that the index on Dec. 24 was still considerably higher than it has been in several months.

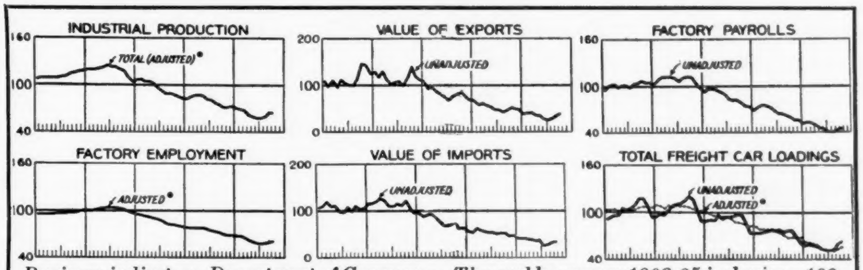
	Week Ended		
	Dec. 24 1932	*Dec. 17 1932*	*Dec. 26 1931*
Freight car loadings	*56.0	56.6	60.4
Steel mill activity	†14.8	18.4	32.4
Electric power prod.	65.4	65.5	75.4
Automobile production	69.9	72.4	39.8
Carded cotton cloth prod.	93.1	97.2	76.4
Combined index	*57.5	58.5	62.3

*Subject to revision. †Revised.

Indices of Business

	Latest Available Month	Previous Month	Year Ago
Automobile Production, Nov.	48,934	84,141	80,142
–†Brokers Loans, Dec. 21	$395	$393	$611
*Building Contracts, Nov	$105,302	$107,473	$151,195
–*Car Loadings, Dec .17	516	521	581
†Commercial Paper, Nov. 30	$109	$113	$174
–†Elec. output, kwh, Dec. 17	1,563	1,518	1,675
Payrolls, Nov	43.5	42.1	59.4
Failures, Dun, Nov	670	640	817
*Merchandise Imports, Nov	$104,000	$106,000	$149,480
*Merchandise Exports, Nov	$139,000	$153,000	$193,540
Furnaces in Blast, Dec. 1	17.9	17.2	21.3
*Steel Orders, Nov. 30	1,968	1,997	2,933

*000 omitted. †000,000 omitted. –Weeks, not months.



Business indicators, Department of Commerce. The weekly average 1923-25 inclusive=100.

Chemical Prices

Shipments of chemicals into consuming industries declined sharply in December even from the level reached in November. Producers turned most of their attention to completing the signing up of 1933 contracts and in most divisions of the industry little contract tonnage remained unsigned as the year closed.

Prices were fairly steady in most instances. Fresh weakness was reported, however, in the bichromate market. With large tonnage quotations down as low as 4.4 cents on soda a new record for all time was established. In the chromic acid market, despite somewhat better demand from the automobile manufacturers, keen competition for existing business brought about a further downward revision in prices. The unsettlement in the di-and tri-sodium phosphates continued without change. As the new year opened lower prices were announced for the lead pigments. Most of the alkali tonnage was reported signed as the month closed. Prices were pretty firmly held, although ash was much stronger than caustic. Reports on mineral acids were somewhat conflicting. Some producers reported the majority of consumers already under contract, while others were experiencing some difficulty in getting buyers in line at 1932 figures. Chlorine producers added another 10 cents per hundred pounds advance to the November increase.

Certain of the fine chemicals were in greater demand due to the prevalence of a mild epidemic of influenza in parts of the country. The last two weeks of the year saw a sharp decline in the volume of shipments of coaltar chemicals and dyestuffs, but prices were well maintained. Expansion in toluol demand was looked for shortly after the turn of the year.

In the fertilizer division certain of the ammoniates were stronger, notably blood and tankage, and, in certain quarters, there was talk of higher prices for nitrate of soda. Sudden signing of the Cosach dissolution decree on Jan. 2 may change this outlook.

Most of the oils with the exception of linseed were lower in December. Naval stores passed through a quiet 30 day period with poor demand compensated in part by light offerings in the primary centers. Prices were generally lower however. Violent changes in temperatures in most of the East aided in moving a considerable quantity of anti-freeze materials.

In most divisions of the industry it is thought that fourth quarter tonnages were the heaviest of any of the preceding quarters. Further, it is expected that the first quarter of 1933 will equal the rate of activity in the last three months of 1932. Immediate improvement is looked for in lacquer producing materials and solvents.

Important Price Changes

Advances	Dec.	Nov.
Chlorine, tanks	$1.75	$1.65
Divi divi	28.00	26.00
Tin tetrachloride	.1442	.1413
Declines		
Acid, Cresylic, 97-99%	.42	.45
Ammonium sulfate	20.50	21.00
Cottonseed meal	25.50	26.00
Cream of tartar	.15½	.16
Egg Albumen	.80	.82
Egg Yolk, spray	.43	.44
Gum Tragacanth, No. 1	.70	.75
No. 2	.60	.63
Nickel chloride	.17	.18
Potassium bichromate	.07¼	.07⅞
Sodium bichromate	.044	.04¾
Steamed bone	19.00	20.00

Acid Acetic — The usual seasonal decline was further aggrevated by reduced operative schedules prevailing in most consuming industries. Consumption in the rayon field, however, held up fairly well. October imports of acetic or pyroligneous amounted to 2,792,347 pounds as compared with 698,360 pounds in the same month last year.

Acid Boric — Producers reported volume as satisfactory and prices were firm and unchanged. Shipments into the pharmaceutical trade were particularly encouraging.

Acid Chromic — A pick-up in activity in the automobile centers was reflected in a greater call for material and December was a fairly good month for shipments.

Acid Citric — Shipments were in small quantities at unchanged prices.

Acid Formic — While the textile industry showed less curtailment than most of the other consuming industries, demand was irregular as a number of mills closed temporarily for the inventory period. Prices were firm and unchanged.

Acid Lactic — Demand from the food and textile industries was better for this time of the year than anticipated in most quarters. Price structure in this item has remained frm and unaltered for a long period, with the outlook for a continuance of present levels particularly bright.

Acid Sulfuric — Shipments declined in December, principally, because of the lower rate of activity (14%) in the steel centers. Fertilizer producers were still marking time and no change is looked for in this quarter until the second or third week of January. Despite the dull state of the market, prices were fairly well maintained. October exports amounted to 157,769 pounds as against 182,849 pounds in the same month a year ago. Imports totaled 126,950 pounds, contrasted with 271,620 pounds in the corresponding month last year. Production of sulfuric acid by makers of superphosphate during October totaled 83,609 short tons, according to a preliminary estimate by the U. S. Bureau of Census. This compared with a revised total of 60,275 tons in September and 106,751 tons in October last year. This estimate is based upon reports received from 76 fertilizer manufacturers operating 104 plants. October consumption in fertilizer manufacture was 73,928 tons, against 52,562 tons in the preceding month and 95,478 tons in the corresponding month of 1931. Stocks on hand at the end of October totaled 88,840 tons, against 88,276 tons in the preceding month and 100,643 tons at the end of October last year.

*Short tons**

	Oct., 1932	Sept., 1932
Production and purchases—		
Produced by reporting establishments, total	83,609	60,275
North dist	52,625	43,406
South dist	30,984	16,869
Purchased from fertilizer mfr. total	16,224	11,846
North dist	4,440	2,156
South dist	11,784	9,690
Purchased from non-fertilizer mfr., total	9,158	4,652
North dist	3,058	3,177
South dist	6,100	1,475
Consumed in fert. mfr., and shipment—		
Consumed by reporting establishments in production of fertilizer, total	73,928	52,562
North dist	35,716	26,692
South dist	38,212	25,870
Shipments—		
To other than fertilizer mfrs. total	23,579	23,261
North dist	20,516	19,523
South dist	3,063	3,738
To fert. mfrs., total	10,920	7,139
North dist	5,687	6,037
South dist	5,233	1,102
Stocks on hand, total	88,840	88,276
North dist	67,343	69,139
South dist	21,497	19,137

*North district, states north of Virginia-North Carolina line; South district, states south of Virginia-North Carolina line.

Note:—September figures have been revised, those for October are preliminary.

Acid Tartaric — Domestic producers and importers were particularly active, attempting to obtain the best part of the relatively small amount of business being transacted pending the inventory period. October imports amounted to 50,000 pounds as against 169,144 pounds in the same month last year.

Alcohol — Extremes in temperature in December aided second-hands in moving fairly large quantities of anti-freeze and served to bolster up the market at a time when it was particularly needed. Producers were devoting most of their time to closing contracts for the first quarter at prices unchanged from current levels. Quotations for denatured alcohol to be delivered during the period Jan. 1 to March 31, 1933, are as follows:—

	Cents per gallon
*C. D. No. 5, drums, car lots	38.5
5 to 19 drums	44.5
1 to 4 drums	46.5
S. D. No. 1, tanks	30.4
drums, car lots	34.6
15 to 19 drums	40.6
20 drums	36.6
1 to 4 drums	42.6
barrels, car lots	37.6
5 to 19 barrels	43.6
1 to 4 barrels	45.6

*Credit of 1c per gallon given on purchases of car lots or more.

Aluminum Sulfate — The rate of activity in the paper industry declined sharply in December and shipments into this industry were smaller in volume than for any previous month in 1932. Slight, but immediate improvement is looked for early in January as stocks in the hands of consumers are known to be exceptionally small.

Ammonia, Aqua — A slight let-down in activity in the textile centers, plus a desire on the part of consumers to close the year with small inventories, slowed down shipments into these centers.

Ammonia Anhydrous — Sellers were busy closing the balance of the 1933 contracts still open. The price recently announced was being strictly adhered to and practically all consumers were taking advantage of the favorable contract price, rather than depending upon purchasing in the spot market.

Barytes — After weeks of indecision several producers announced as the month closed that they would renew prices for 1933 at the 1932 level.

Benzol — Interest centered in the probable market trend immediately following the turn of the year. Feeling is general that stocks in the hands of consumers are at a record low point and that a decided pick-up is more than likely in January. The curtailment in steel activity (close to the record low of July) prevented any large accumulation of stocks in first hands and held the market in a firm position despite the restricted shipments of December and the last ten days of November.

Bleaching Powder — Producers reported practically all 1933 contracts in. Shipments in December were off considerably from the volume reached in October and November. October imports amounted to 151,059 pounds as compared with 154,657 pounds in the corresponding period last year. Exports in October totaled 255,318 pounds as compared with 128,144 pounds in the same month 1931.

Butyl Alcohol — Producers announced during the month that 1933 prices would duplicate the 1932 schedule. A slight pick-up in shipments was caused by speeding up of operations in the Detroit area.

Calcium Chloride — Shipments for refrigerating purposes were reported in satisfactory volume. Producers are greatly encouraged by the growth in the use of this commodity for coal-treating. Contracts for 1933 were being closed at current levels.

Casein — Little was expected in this market in the closing weeks of the year and consumers bought only in small quantities. The price structure remained quite firm, however, and domestic 20-30 mesh was quoted at 7-7½c.

Carbon Black — Producers reported that bookings for January shipments are light but some improvement is looked for at the turn of the year. No change in the price structure occurred. A turn for the better is anticipated in the Akron area as soon as the automobile producers get into full swing on the new models.

Carbon Bisulfide — Consumers restricted shipments to relatively small quantities as the annual inventory period approached. The response on contract renewals was reported satisfactory by producers. October exports totaled 204,838 pounds as against 265,240 pounds in the same month last year.

Chlorine — The firmer tone in this market, brought about in November by a 10 cent rise, carried over into December. In some quarters, talk centered on the possibility of a further increase, and finally Dec. 30 an additional 10 cents was added to the carlot price. Renewal of the cylinder contracts at 1932 prices continued at a fairly lively pace.

Coaltar Dyes — The usual year-end let-down brought about a curtailment of demand from the textile centers. Producers, however, have enjoyed a fairly good quarter and indications point to resumption of textile activity early in January. Prices were well maintained.

Copperas — Further decline in steel mill activity to 14% prevented any surplus from appearing in the market and prices remained firm and unchanged.

Copper Sulfate — The easier tone in the market for red metal had no effect on the sulfate price. Being off-season, buying was extremely light both for domestic consumption and for export.

Cresylic Acid — The continued poor demand from the mining industry has had a detrimental effect on the market for this commodity, but a slight improvement in the exchange rate towards the close of the month firmed up prices slightly. During the month 97-99% grade was reduced.

Dextrin — Prices at the new level established in November were steady in face of light demand from most of the consuming industries.

Egg Yolk — This item was off slightly during the month, due, principally, to the lessened demand in face of fairly heavy supplies coming into the market. Consumers held purchases to small lots in anticipation of the year-end inventory.

Ethyl Acetate — Producers were renewing contracts for the first quarter at prices unchanged from the current level.

Glycerine — Firmer prices were caused by a broadening demand for material for anti-freeze purposes. Shipments of crude grades were still unsatisfactory. British glycerin exports in the first nine months of this year comprised 22,696 hundredweights of crude and 93,217 hundredweights of distilled, with an aggregate volume of £227,420. In the corresponding period in 1931 exports were:—Crude, 17,856 hundredweights; distilled, 59,818 hundredweights; aggregate value, £168, 938. Imports in the same periods were:—Crude, 15,106 hundredweights in 1932, 13,070 hundredweights in 1931; distilled, 33,098 hundredweights in 1932, 16,257 hundredweights in 1931.

Insecticides — Manufacturers of insecticidal preparations were a little more active and a number of inquiries for nicotine sulfate, calcium arsenate and lead arsenate were abroad in the market, but little actual business was placed.

Intermediates — Demand was off, particularly in the last two weeks of the month, but prices were well maintained. The most active items were phthalic anhydride and nitrobenzene.

Lead, White — As the month closed no definite announcement was made by corroders as to their attitude towards Spring dating invoices and the market was unsettled pending some actual indication of the trend for the next few months.* Lead prices were fairly well maintained during the month. Lead stocks increased during November, totaling 174,629 tons at the end of that month against 150,171 tons at the end of October and 144,057 tons at the end of November last year, according to American Bureau of Metal Statistics. U. S. production of lead in November was 27,338 tons against 28,076 tons in October and 35,491 tons in November, 1931. Domestic shipments in November were 22,838 tons against 29,764 tons in October and 31,216 tons in November, 1931. The production of lead in the U. S. from Jan. 1 to Dec. 1 was 307,614 tons against 440,984 tons in the corresponding period of 1931. Eleven months' shipments totaled 284,183 tons against 398,652 tons in 1931.

Mercury — Although demand was rather slow in the past 60 day period the price structure held up fairly firm and sales were generally made at the $49-$51 range. In the last few days of the month a few sales, however, were reported at $48.

Methanol — Shipments, particularly for anti-freeze grade, were in good volume in the first three weeks of the month, but declined rapidly as the holiday and inventory period was reached. Prices were firm and unchanged. Monthly statistics on production, shipments and stocks of methanol and acetate of lime, based on data reported to Bureau of the Census, by 34 identical establishments are given below. The establishments which reported their operations to the bureau, according to the returns for the biennial census of manufactures, 1929, produced in that year 79 per cent. of the total output of the U. S. of crude methanol, 92.1 per cent. of refined methanol from wood distillation, and 79.3 per cent. of acetate of lime:—

Methanol

	Gallons 1932 Sept.	Oct.
Refined—		
Wood distillation—		
Production	102,448	197,534
Shipments	92,220	159,491
Stocks, end of month	257,763	295,806
Synthetic—		
Production	697,890	571,372
Shipments	550,862	958,909
Stocks, end of month	3,829,635	3,442,098
Crude—		
Production	98,108	249,142
Shipments	246,139	264,857
Stocks, end of month	329,507	313,792

*Prices were revised downward Jan. 3. See quotations.

Acetate of Lime

	Pounds	
Production	1,563,312	2,616,003
Shipments	3,113,431	3,756,394
Stocks, end of month	4,398,913	3,258,522

Nickel Chloride — Producers brought the market down to 17 cents in barrels in the last week of the month.

Nitrogenous Material — Domestic material weakened in the middle of the month, but held firmly at the $1.40 level in the last week.

Phosphate Rock — Little tonnage changed hands during the past month. Buyers were holding off until the turn of the year before making definite commitments.

Potash — Quiet conditions prevailed in this market during the greater part of the month. Domestic producers reported encouraging number of inquiries for future delivery, but actual tonnage shipped was considerably below the figures for the month previous.

Potash Carbonate — Demand tapered off considerably in the last two weeks. Importers have been cautious in their commitments, however, and stocks are not excessive. October imports aggregated 840,714 pounds as against 1,737,115 pounds in the same month last year.

Potash Caustic — A quiet market prevailed throughout the month, and, as in the case of potash carbonate, importers held shipments down to extremely low volume with the result that stocks were not very large. In fact October imports showed a severe drop to 316,632 pounds from 803,071 pounds in the same month last year. Potassium compounds produced for sale by manufacturers in U. S. in 1931 had a valuation of $7,972,000 at factory prices, according to Bureau of the Census, being a decrease of 20.3 per cent. as compared with 1929, the last previous census year, when the output was valued at $9,998,054. Comparative figures for 1929 and 1931 as to kind, quantity and value follow, the figures referring to production for sale and do not include data for amounts made and consumed in the same establishments:—

Potassium Compounds

	1931	*1929*
Bitartrate (cream of tartar):—		
Pounds	6,971,444	7,852,559
Value	$1,572,337	$1,930,577
Citrate:—		
Pounds	139,935	151,074
Value	$72,451	$80,701
Iodide:—		
Pounds	380,047	443,557
Value	$1,290,565	$1,487,166
Hydroxide:—		
Tons	*4,818	*7,191
Value	$580,765	$637,977
Acetate:—		
Pounds	80,119	$5,861,633
Value	$22,816	
Other (chloride, xanthate, rochelle salt, etc.), value	$4,433,066	
Total values	$7,972,000	$9,998,054

*For 1931, basis 88 to 92 per cent.; for 1929, as reported, regardless of strength.

Rosin — The month was generally one of lower prices both in the primary centers and locally, and a good part of the price gains made since August have by now been lost. In the local market "B" went to a new record low. Only occasional inquiries

were reported in Savannah and Jacksonville, and the total business placed was the smallest for several months. Some improvement is expected, however, with the turn of the year.

Soda Ash — Both producers and dealers were devoting most of their energies to completing 1933 contracts. Spot business was particularly light.

Soda Caustic — Desire on the part of consumers to close the year with small inventories was reflected in tonnages. A firmer tone exists in ash than in caustic. The decline in exports of the latter and the problem of placing a large tonnage of electrolytic has had an unstabilizing influence on the market. October exports amounted to 8,810,468 pounds, as against 10,079,817 pounds in the same month last year.

Soda Sal — The market remained fairly stable with prices fairly well maintained in New York but with some weakness in the Paterson area.

Sodium Nitrate — Actual sales were limited to very small quantities and the chief interest in the market lay in the rumors of a possible increase in prices with the turn of the year. Quotations for December-June delivery, basis ex-vessel at the ports, subject to change without notice: To fertilizer manufacturers $23.90 per ton in bulk; $25.20 per ton in 200-pound bags, and $25.90 per ton in 100-pound bags. To fertilizer dealers, $25.80 per ton in 200-pound bags and $26.50 per ton in 100-pound bags.

Sodium Phosphate — Activity in the Paterson area declined as the month and year ended, with the result that the demand for di-soda was irregular. There appeared to be little change in the highly competitive situation in phosphates, but the price structure was if anything slightly firmer in most quarters. Shipments of tri-salt were also off with little or no change in prices. It is expected that some upward revision will be made shortly, as the present level is thought to be actually below the cost of manufacture.

Sodium Silicate — Producers reported a noticeable decline in shipments of water-white into the silk-weighting centers and also in the cloudy material for boxboard and corrugated box manufacture. According to reports practically all of the tonnage for 1933 has been signed up and at levels unchanged from 1932. October exports totaled 4,169,213 pounds, contrasted with 4,341,544 pounds in the corresponding month last year.

Solvent Naphtha — A noticeable pick-up was caused by a slight expansion in lacquer plants supplying the automobile field. Nevertheless, further improvement is looked for immediately following the first of the year as several of the lacquer manufacturers were said to be drawing on reserve stocks rather than placing orders with suppliers for immediate delivery. Prices were firmly held at current quotations.

Sulfur — Shipments declined in the last two weeks of the month when compared with the two previous months. Production of sulfur in Texas for the third quarter of the year ending September, was 194,470 tons, according to the State Comptroller's office in that state. This compared with 241,958 tons in the year's second quarter and 250,909 tons in the first quarter of the year.

Superphosphate — The market was weak with trading in light volume. Run-of-the-pile was quoted at $6.50 and 16% at $7.00. Production of bulk superphosphate in September as reported to the Bureau of Census by eighty-seven manufacturers operating 158 plants totaled 117,157 short tons, against 112,919 tons in the preceding month and 173,271 tons in September, 1931. The production of base and mixed superphosphate was 6,247 tons, against 7,583 tons in August and 1,565 tons in September last year. Stocks of bulk material on hand at the end of September totaled 853,035 tons, against 868,657 tons in August and 1,153,800 tons in September, 1931, and stocks of base and mixed goods totaled 242,560 tons in September, against 323,894 tons in August and 367,229 tons in September, 1931.

	Short tons *Sept., 1932*	*Aug., 1932*
Production and Receipts—		
Production—		
Bulk superphosphate—		
Totals, U. S.	117,175	112,919
North dist	68,907	74,583
South dist	48,268	38,336
Base and mixed goods—		
Totals, U. S.	6,247	7,583
North dist	3,438	5,706
South dist	2,809	1,877
Received from other acidulators (including inter-company transfers†—		
Totals, U. S.	8,032	7,350
North dist	5,477	6,870
South dist	2,555	480
Shipments—		
Bulk superphosphate—		
Totals, U. S.	138,278	63,433
North dist	114,350	49,657
South dist	23,928	13,776
To mixers—		
Totals, U. S.	36,502	38,839
North dist	22,894	29,200
South dist	13,608	9,639
To other acidulators (including inter-company transfers)—		
Totals, U. S.	20,997	12,319
North dist	18,907	11,281
South dist	2,090	1,038
To consumers—		
Totals, U. S.	80,779	12,275
North dist	72,549	9,176
South dist	8,230	3,099
Base and mixed goods—		
Totals, U. S.	90,631	13,438
North dist	84,755	9,515
South dist	5,876	3,923
Stocks—		
Bulk superphosphate—		
Totals, U. S.	853,035	868,657
North dist	379,213	427,020
South dist	473,822	441,637
Base and mixed goods—		
Totals, U. S.	242,560	323,894
North dist	98,498	172,412
South dist	144,062	151,482

Tanning Materials — With the tanning sections operating at very reduced schedules in the last three weeks of the month in anticipation of the year-end inventory, demand for most of the items in this division declined sharply from the October-November level. Divi-divi, myrobalans and valonia quotations were off from 50 cents to a dollar a ton. Quebracho proved to be an exception, however, and the schedule was strictly adhered to, although actual business placed was small.

Tin Salts — A slight strengthening in the price for the metal brought about an upward revision in the price for tetrachloride.

Toluol — Slight improvement was noticeable as the Detroit area started production on 1933 models, but the real test will come only after the various shows and the automobile producers decide on production schedules for the first quarter.

Turpentine — With consumers eager to hold small stocks at the close of the year the markets locally and in the South were drab affairs and prices slumped off from the November level. Receipts in the primary centers were moderate and this prevented the market from suffering still further weakness. In most quarters optimism prevails, however, as to the course of prices with the turn of the year.

Varnish Gums — The demand declined quite noticeably in the closing week of the month. Inquiries for copal, dammar, elemi and kauri were for small quantities only. Cable advices from primary centers, however, reported small offerings in most cases, with the result that the market was fairly firm.

Zinc Salts — The price structure of the salts remained steady and unchanged in the face of dullness in the metal market. World zinc production in November totaled 70,079 tons against 69,569 tons in October and 81,760 tons in November last year, according to American Bureau of Metal Statistics. Total output for 11 months of 1932 was 796,755 tons against 1,050,691 tons in the corresponding period last year.

FATS AND OILS

Trading in most items was limited to small lots particularly in the last half of the month as consumers were anxious to turn the year with extremely light inventories. Fortunately for the price structure offerings were generally light, but despite this, prices were again off from the previous month's figures and practically all the gains made in the bull market of July-September have now been lost. In not a few instances prices closed the year at new lows. One outstanding exception was linseed which went to a new high for the year late in the month. Crop estimates indicate that the supply of flaxseed will be much less in the coming season and the market turned bullish in the face of unsatisfactory conditions in most of the other commodity markets. In most quarters it was felt that some improvement both in demand and in prices of oils would likely occur with the turn of the year, but stocks of most items are large and, therefore, any upward movement will have to combat this situation.

GLUCONIC ACID
TECHNICAL

GLUCONO DELTA LACTONE
(A Purified Anhydride of Gluconic Acid)

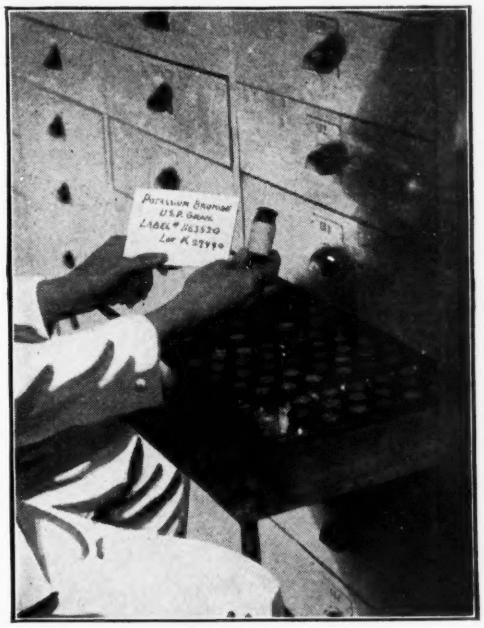
CHAS. PFIZER & CO., Inc.
MANUFACTURING CHEMISTS

Established 1849

81 Maiden Lane
NEW YORK, N. Y.

444 W. Grand Avenue
CHICAGO, ILL.

For BROMIDES: Mallinckrodt



Before each lot is released for sale it is carefully tested in the control laboratories. A reserve sample of each lot bearing an identifying number is retained as a check on the quality of every package.

A PARTIAL LIST

- Ammonium Bromide U.S.P.
- Calcium Bromide U.S.P.
- Potassium Bromide U.S.P. Cryst., Gran. and Powd.
- Sodium Bromide U.S.P. Gran. and Powd.
- Strontium Bromide U.S.P. IX Cryst. and Gran.
- Barium Bromide Pure
- Cadmium Bromide Crystals
- Copper Bromide (Cupric)
- Ethyl Bromide (Ether Hydrobromic)
- Ethylene Bromide
- Iron Bromide (Ferrous)
- Lead Bromide
- Lithium Bromide N.F.
- Magnesium Bromide
- Manganese Bromide
- Nickel Bromide
- Zinc Bromide Pure

Can be supplied in special forms to meet individual specifications.

Furnished in suitably sized containers to fit the individual requirements. Full information and prices on request.

One of 1500 Mallinckrodt fine Chemicals
FOR MEDICINAL USE

ST. LOUIS · CHICAGO · PHILADELPHIA · NEW YORK · TORONTO · MONTREAL

Prices Current

Heavy Chemicals, Coaltar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Naval Stores, Fatty Oils, etc.

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f. o. b. works are specified as such. Imported chemicals are so designated. Resale stocks when a market factor are quoted in addition to makers' prices and indicated "second hands."

Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f. o. b., or ex-dock. Materials sold f. o. b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both. Containers named are the original packages most commonly used.

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1931 Average $1.404 - Jan. 1931 $1.283 - Dec. 1932 $1.69

	Current Market		1932 Low	1932 High	1931 Low	1931 High
Acetaldehyde, drs 1c-1 wks...lb.	.18½	.21	.18½	.21	.18½	.21
Acetaldol, 50 gal dr..........lb.	.27	.31	.27	.31	.27	.31
Acetamide..................lb.	.95	.35	.95	1.35	.95	1.35
Acetanilid, tech, 150 lb bbl...lb.	....	.26	.20	.26	.22	.23
Acetic Anhydride, 92-95%, 100 lb cbys..................lb.	.21	.25	.21	.25	.21	.25
Acetin, tech drums..........lb.	.30	.32	.30	.32	.30	.32
Acetone, tanks..............lb.	....	.10	...	.10	.10	.10½
Acetone Oil, bbls NY.......gal..	1.15	1.25	1.15	1.25	1.15	1.25
Acetyl Chloride, 100 lb cby...lb.	.55	.68	.55	.68	.55	.68
Acetylene Tetrachloride (see tetrachlorethane).............						
Acids						
Acid Abietic..................	.12	.12	.12	.12	.12	.12
Acetic, 28% 400 lb bbls c-1 wks ....100 lb.	2.65	2.75	2.40	2.75	2.40	2.60
Glacial, bbl c-1 wk....100 lb.	....	9.14	8.35	9.14	8.35	9.23
Glacial, tanks.............	....	8.89	8.10	8.89	8.10	8.98
Adipic......................	.72	.72	.72	.72	.72	.72
Anthranilic, refd, bbls........lb.	.85	.95	.85	.95	.85	.95
Technical, bbls............lb.	.65	.70	.65	.70	.65	.80
Battery, cbys...........100 lb.	1.60	2.25	1.60	2.25	1.60	2.25
Benzoic, tech, 100 lb bbls....lb.	.35	.45	.35	.45	.35	.45
Boric, powd, 250 lb. bbls. ....lb.	.0425	.05	.0425	.07	.06½	.07¾
Broenner's, bbls.. ....lb.	1.20	1.25	1.20	1.25	1.20	1.25
Butyric, 100% basis cbys....lb.	.80	.85	.80	.85	.80	.85
Camphoric..................lb.	....	5.25	.....	5.25	.....	5.25
Chlorosulfonic, 1500 lb drums wks.....................lb.	.04½	.05½	.04½	.05½	.04½	.05½
Chromic, 99½%, drs.........lb.	.11½	.12¼	.11½	.14½	.14½	.17
Chromotropic, 300 lb bbls....lb.	1.00	1.06	1.00	1.06	1.00	1.06
Citric, USP, crystals, 230 lb. bbls.....................lb.	.29	.30	.29	.33½	.33½	.43
Cleve's, 250 lb bbls.........lb.	.52	.54	.52	.54	.52	.54
Cresylic, 95%, dark drs NY.gal.	.40	.41	.40	.47	.42	.60
97-99%, pale drs NY.....gal.	.42	.44	.42	.50	.49	.60
Formic, tech 90%, 140 lb. cby.....................lb.	.10½	.12	.10½	.12	.10½	.12
Furoic, tech., 100 lb. drums.lb.	....	.35	.....	.....	.....	.....
Gallic, tech, bbls............lb.	.60	.70	.60	.70	.60	.70
USP, bbls.................lb.	....	.74	.....	.74	.....	.74
Gamma, 225 lb bbls wks.....lb	.75	77	.75	.80	.77	.80
H, 225 lb bbls wks...........lb.	.60	.65	.60	.65	.60	.70
Hydriodic, USP, 10% soln cby lb.	.59	.60	.59	.67	.....	.67
Hydrobromic, 48%, coml, 155 lb cbys wks............lb.	.45	.48	.45	.48	.45	.48
Hydrochloric, CP, see Acid Muriatic..................						
Hydrocyanic, cylinders wks .lb.	.80	.90	.80	.90	.80	.90
Hydrofluoric, 30%, 400 lb bbls wks.....................lb.	....	.06	.....	.06	.....	.06
Hydrofluosilicic, 35%, 400 lb. bbls wks...............lb.	.11	.12	.11	.12	.11	.12
Hypophosphorous, 30%, USP, demijohns ....lb.	.75	.80	.75	.85	.....	.85
Lactic, 22%, dark, 500 lb bbls lb.	.04	.04½	.04	.04½	.04	.04½
44%, light, 500 lb bbls.....lb.	.11½	.12	.11½	.12	.11½	.12
Laurent's, 250 lb bbls.... ...lb.	.36	.42	.36	.42	.36	.42
Linoleic....................lb.	.16	.16	.16	.16	.16	16
Malic, powd, kegs...........lb.	.45	.60	.45	.60	.45	.60
Metanilic, 250 lb bbls........lb.	.60	.65	.60	.65	.60	.65
Mixed Sulfuric - Nitric.........						
tanks wks..........N unit	.07	.07½	.07	.07½	.07	.07½
tanks wks..........S unit	.008	.01	.008	.01	.008	.01
Monochloroacetic, tech bbl...lb.	.20	.30	.20	.30	.20	.30
Monosulfonic, bbls..........lb.	1.55	1.60	1.55	1.70	1.65	1.70
Muriatic, 18 deg, 120 lb cbys c-1 wks............100 lb.	....	1.35	.....	1.35	.....	1.35
tanks, wks..........100 lb.	....	1.00	.....	1.00	.....	1.00
20 degrees, cbys wks...100 lb.	....	1.45	.....	1.45	.....	1.45
N & W, 250 lb bbls............	.85	.95	.85	.95	.85	.95
Naphthionic, tech, 250 lb......	.60	.65	.60	.65	.60	.65
Nitric, 36 deg, 135 lb cbys c-wks. ....100 lb.	....	5.00	.....	5.00	.....	5.00
40 deg, 135 lb cbys, c-1 wks................100 lb.	....	6.00	.....	6.00	.....	6.00
Oxalic, 300 lb bbls wks NY....lb.	.11	.11½	.11	.11½	.10¾	.11½
Phosphoric 50%, U. S. P.....lb.	....	.14	.....	.14	.....	.14
Syrupy, USP, 70 lb drs....lb.	....	.14	.....	.14	.....	.14
Picramic, 300 lb bbls........lb.	.65	.70	.65	.70	.65	.70
Picric, kegs.................lb.	.30	.50	.30	.50	.30	.50
Pyrogallic, crystals............ ....lb.	1.45	1.5	1.45	1.60	1.50	1.60
Salicylic, tech, 125 lb bbl.....lb.	.33	.37	.33	.37	.33	.37
Sebacic, tech, drum..........lb.	.58	.58	.....	.....	.....	.....
Sulfanilic, 250 lb. bbls.......lb.	.14½	.15	.14½	.16	.15	.16

*Credit of 1c gal on 3 carlots or more.

	Current Market		1932 Low	1932 High	1931 Low	1931 High
Sulfuric, 66 deg, 180 lb cbys 1c-1 wks...........100 lb.	1.6	1.95	1.60	1.95	1.60	1.95
tanks, wks, ton	....	15.00	.....	15.00	.....	15.00
1500 lb dr wks......100 lb.	1.50	1.65	1.50	1.65	1.65	1.50
60°, 1500 lb dr wks....100 lb.	1.27½	1.42½	1.27½	1.42½	1.42½	1.27½
Oleum, 20%, 1500 lb. drs 1c-1 wks...................ton	....	18.50	.....	18.50	.....	18.50
40%, 1c-1 wks net........ton	....	42.00	.....	42.00	.....	42.00
Tannic, tech, 300 lb bbls...lb.	.23	.40	.23	.40	.23	.40
Tartaric, USP, gran. powd, 300 lb bbls.............lb.	.20	.21	.20	.25½	.25½	.29½
Tobias, 250 lb bbls.........lb.	.75	.80	.75	.85	.80	.85
Trichloroacetic bottles.....lb.	....	2.75	.....	2.75	.....	2.75
Kegs...................lb.	....	2.00	.....	2.00	.....	2.00
Tungstic, bbls..............lb.	1.40	1.70	1.40	1.70	1.40	1.70
Albumen, blood, 225 lb bbls...lb.	.35	.40	.35	.40	.38	.40
dark.............bbls., lb.	.10	.17	.10	.20	.12	20
Egg, edible ....lb.	....	.80	.75	.90	.55	.60
Technical, 200 lb cases...lb.	.62	.66	.62	.66	.48	.66
Vegetable, edible..........lb.	.60	.65	.60	.65	.60	.65
Technical..............lb.	.50	.55	.50	.55	.50	.55
Alcohol						
Alcohol Butyl, Normal, 50 gal drs c-1 wks............lb.	....	.123	.123	.1595	.1495	.17½
Drums, 1-c-1 wks.......lb	....	.128	·128	.1645	.1545	.17½
Tank cars wks..........lb.	....	.113	.113	.143	.143	.16½
Amyl (from pentane)						
Tanks wks ....lb.	....	.176	.176	.203	.203	.236
Capryl, tech, drums.......lb.	....	.85	.....	.85	.....	.....
Diacetone, 50 gal drs del...gal.	1.42	1.60	1.42	1.60	1.42	1.60
Ethyl, USP, 190 pf, 50 gal. bbls................gal.	2.56½	2.65	2.55	2.65	2.37	2.75
Anhydrous, drums ...gal.	.54	.58	.54	.58	.54	.60
No. 5. *188 pf, 50 gal. drs. drums extra.........gal.	....	.385*	.27	.396	.27	.44
No. S. D. 1, tanks ......gal.	....	.304	.....	.....	.....	.....
Furfuryl, tech., 500 lb. drs.lb	.....	.45	.....	.....	.....	.....
Isobutyl, ref., gal. drs.....gal.	....	.75	.....	.75	.....	.....
Isopropyl, ref, gal drs.....gal.	.45	.50	.45	.65	.60	1.00
Propyl Normal, 50 gal dr..gal.	....	.75	.....	.75	.....	1.00
Aldehyde Ammonia, 100 gal drlb.	.80	.82	.80	.82	.80	.82
Alpha-Naphthol, crude, 300 lb. bbls...................lb.	.57	.58	.57	.65	.60	.65
Alpha-Naphthylamine, 350 lb. bbls...................lb.	.32	.34	.32	.34	.32	.34
Alum Ammonia, lump, 400 lb bbls, 1-c-1 wks......100 lb.	3.00	3.25	3.00	3.25	3.00	3.50
Chrome, 500 lb casks, wks ....100 lb.	4.50	5.25	4.50	5.25	4.50	5.25
Potash, lump, 400 lb casks wks..............100 lb.	3.00	3.50	3.00	3.50	3.00	3.50
Soda, ground, 400 lb bbls wks ....100 lb.	3.50	3.75	3.50	3.75	3.50	3.75
Aluminum Metal, c-1 NY.100 lb.	?2.90	24.30	22.90	24.30	22.90	24.30
Chloride Anhydrous ......lb.	.05	.09	.05	.09	.05	.09
Hydrate, 96%, light, 90 lb. bbls...................lb.	.15	.16½	.`5	.17	.16	.17
Stearate, 100 lb bbls.......lb.	.15	.17	.15	.21	.18	.22
Sulfate, Iron, free, bags c-1 wks ....100 lb.	1.90	1.95	1.90	1.95	1.90	1.95
Coml, bags c-1 wks .100 lb.	1.25	1.30	1.25	1.30	1.25	1.30
Aminoazobenzene, 110 lb kegs lb.	....	1.15	.....	1.15	.....	1.15
Ammonia						
Ammonia anhydrous Com. tanks	....	.05	.05	.05½	.....	.05½
Ammonia, anhyd. 100 lb cyl...lb.	.15½	.15½	.15½	.15½	.15½	.15½
Water, 26°, 800 lb dr del...lb.	.02½	.03	.02½	.03	.02½	.03½
Ammonia, aqua 26° tanks....	....	.02½	.....	.02½	.02½	.02½
Ammonium Acetate ....lb.	.26	.33	.26	.39	.28	.39
Bicarbonate, bbls., f.o.b. plant ....100 lb.	....	5.15	.....	5.15	.....	5.15
Bifluoride, 300 lb bbls.....lb.	.14½	.17	.14½	.22	.21	.22
Carbonate, tech, 500 lb cs..lb.	.08	.12	.08	.12	.09	.12
Chloride, white, 100 lb. bbls wks ....100 lb.	4.50	5.15	4.45	5.15	4.45	5.15
Gray, 250 lb bbls wks...lb.	5.25	5.75	5.25	5.75	5.25	5.75
Lump, 500 lb cks spot...lb.	.10½	.11	.10½	.11½	.11	.11½
Lactate, 500 lb bbls.......lb.	.15	.16	.15	.16	.15	.16
Linoleate.................lb.	....	.11	.11	.15	.15	.....
Nitrate, tech, casks........lb.	.06	.10	.06	.10	.06	.10
Oleate, drs...............lb.	....	.10	.....	.10	.....	.....
Persulfate, 112 lb kegs.....lb.	.20	.22½	.20	.27½	.25	.30
Phosphate, tech, powd, 325 lb. bbls...................lb.	.08½	.11½	.08½	.12	.11½	.12
Sulfate, bulk c-1.......100 lb.	.. .	1.02	.90	1.40	1.10	1.80
Nitrate, 26% nitrogen 31.6% ammonia imported bags c.i.f............ton	34.60	35.00	34.60	35.00	34.60	35.00
Sulfocyanide, kegs........lb.	.36	.48	.36	.48	.36	.48

		Current Market		1932 Low	1932 High	1931 Low	1931 High
Amyl Acetate, (from pentane) Tanks	lb.	....	.157	.157	.17½	.16	.222
Tech., drs	lb.	.17½	.18	.17½	.18	.16½	.236
Amyl Alcohol, see Fusel Oil.....							
Furoate, 1 lb tins	lb.		5.00	.....	5.00	.....	5.00
Aniline Oil, 960 lb drs & tks	lb.	.14½	.16	.14½	.16	.14½	.16
Annatto, fine	lb.	.34	.37	.34	.37	.34	.37
Anthraquinone, sublimed, 125 lb. bbls	lb.	....	.45	.45	.55	.50	.55
Antimony, metal slabs, ton lots	lb.		.06	.05	.06½	.06¾	.07½
Needle, powd, bbls	lb.	.07	.08	.08½	.09	.08¾	.09
Chloride, soln (butter of) cbys	lb.	.13	.17	.13	.17	.13	.17
Oxide, 500 lb bbls	lb.	.07½	.08¾	.07½	.08¾	.08½	.08¾
Salt, 63% to 65%, tins	lb.	.20	.23	.20	.24	.22	.24
Sulfuret, golden, bbls	lb.	.16	.20	.16	.20	.16	.20
Vermillion, bbls	lb.	.38	.42	.38	.42	.38	.42
Archil, conc, 600 lb bbls	lb.	.20	.21	.17	.21	.17	19
Double, 600 lb bbls	lb.	.16	.17	.16	.17	.12	.14
Triple, 600 lb bbls	lb.	.16	.17	.16	.17	.12	.14
Argols, 80%, casks	lb.	.12½	.13	.12½	.13	.....	.18¾
Crude, 30%, casks	lb.	.07	.07½	.07	.07½	.07	.08
Aroclors, wks	lb.	.18	.30	.18	.40	.20	.40
Arsenic, Red. 224 lb kegs, cs.	lb.	.09¾	.10	.09¾	.10	.09¾	.10
White, 112 lb kegs	lb.	.04	.05	.04	.05	.03¾	.05
Asbestine, c-1 wks	ton		15.00	.....	15.00	.....	15.00

Barium

		Current Market		1932 Low	1932 High	1931 Low	1931 High
Barium Carbonate, 200 lb bags wks	ton	47.00	57.00	47.00	57.00	56.50	60.00
Chlorate, 112 lb kegs NY	lb.	.13¾	.14¾	.13¾	.15	.14	.15
Chloride, 600 lb bbl wks	ton	63.00	69.00	63.00	69.00	63.00	69.00
Dioxide, 88%, 690 lb drs	lb.	.11	.13	.11	.13	.12	.13
Hydrate, 500 lb bbls	lb.	.04¾	.05½	.04¾	.05½	.04¾	.05½
Nitrate, 700 lb casks	lb.		.07½	.07	.08	.07½	.08½
Barytes, Floated, 350 lb bbls wks	ton	22.00	24.00	22.00	24.00	23.00	24.00
Bauxite, bulk, mines	ton	5.00	6.00	5.00	6.00	5.00	8.00
Beeswax, Yellow, crude bags	lb.	.13	.14	.14½	.24	.22	.31
Refined, cases	lb.	.20	.21	.20	.28	.25	.37
White, cases	lb.	.30	.32	.30	.36	.34	.36
Benzaldehyde, technical, 945 lb. drums wks	lb.	.60	.65	.60	.65	.60	.65
Benzene, 90%, Industrial, 8000 gal tanks wks	gal.		.20	.....	.20	.18	.21
Ind. Pure, tanks works	gal.		.20	.....	.20	.18	.21
Benzidine Base, dry, 250 lb. bbls	lb.	.65	.67	.65	.67	.65	.67
Benzoyl, Chloride, 500 lb drs	lb.	.40	.45	.40	.47	.45	.47
Benzyl Chloride, tech drs	lb.		.30	.....	.30	.....	.30
Beta-Naphthol, 250 lb bbl wk	lb.		.22	.....	.22	.22	.24
Naphthylamine, sublimed, 200 lb bbls	lb.	1.25	1.35	1.25	1.35	1.25	1.35
Tech, 200 lb bbls	lb.	.53	.58	.53	.58	.53	.65
Blanc Fixe, 400 lb bbls wks	ton	60.00	75.00	60.00	80.00	75.00	90.00
Bleaching Powder, 800 lb drs c-1 wks contract	100 lb.	1.75	2.00	1.75	2.00	1.75	2.35
Blood, Dried, fob, NY	Unit	1.55	1.70	1.20	1.90	1.65	3.00
Chicago	Unit	1.50	1.60	1.50	1.60	1.50	2.35
S. American shipt	Unit		2.00	2.00	2.25	2.00	3.20
Blues, Bronze Chinese Milori Prussian Soluble	lb.		.35	.....	.35	.....	.35
Bone, raw, Chicago	ton		22.00	20.00	22.00	21.00	32.00
Bone Ash, 100 lb kegs	lb.	.06	.07	.06	.07	.06	.07
Black, 200 lb bbls	lb.	.06	.08½	.05½	.08½	.05½	.08½
Meal, 3% & 50%, Imp.	ton	19.00	20.00	20.00	23.00	21.00	31.00
Borax, bags	lb.	.018	.02	.018	.03½	.02½	.03½
Bordeaux, Mixture, 16% pwd.	lb.	.11½	.13	.11½	.13	.11½	.13
Paste, bbls	lb.	.11½	.13	.11½	.13	.11½	.13
Brazilwood, sticks, shpmt	lb.	26.00	28.00	26.00	28.00	26.00	28.00
Bromine, cases	lb.	.36	.43	.36	.43	.36	.43
Bronze, Aluminum, powd blk.	lb.	.60	1.20	.60	1.20	.60	1.20
Gold bulk	lb.	.55	1.25	.55	1.25	.55	1.25
Butanes, com 16.32° group 3 tanks	lb.		.04	.....	.....	.....	.....
Butyl, Acetate, normal drs	lb.	.134	.139	.134	.166	.161	.175
Tank, wks	lb.		.124	.124	.143	.143	.175
Aldehyde, 50 gal drs wks	lb.	.31½	.36	.31½	.36	.34	.44
Carbitol see Diethylene Glycol Mono (Butyl Ether)			.....	.....	.....	.....	.....
Cellosolve (see Ethylene glycol mono butyl ether)							
Furoate, tech., 50 gal. dr.	lb.		.50	.....	.50	.....	.50
Propionate, drs	lb.	.20	.22	.20	.25	.22	.25
Stearate, 50 gal drs	lb.	.25	.25½	.25	.25½	.25	.30
Tartrate, drs	lb.	.55	.60	.55	.60	.55	.60
Cadmium, Sulfide, boxes	lb.	.65	.90	.65	.90	.65	.90
Calcium, Acetate, 150 lb bags c-1	100 lb.		2.50	2.00	2.50	.....	2.00
Arsenate, 100 lb bbls c-1 wks	lb.	.05½	.06	.05½	.06	.06	.09
Carbide, drs	lb.	.05	.06	.05	.06	.05	.06
Carbonate, tech, 100 lb bags c-1	lb.	1.00	1.00	1.00	1.00	1.00	1.00
Chloride, Flake, 375 lb drs c-1 wks	ton		21.00	.....	21.00	21.00	22.75
Solid, 650 lb drs c-1 fob wks	ton		18.00	.....	18.00	18.00	20.00
Calcium Furoate, tech, 100 lb. drums	lb.		.30	.....	.30	.....	.....
Nitrate, 100 lb bags	ton	34.00	35.00	34.00	35.00	34.00	43.00
Peroxide, 100 lb drs	lb.		1.25	.....	1.25	.....	1.25
Phosphate, tech, 450 lb bbls.	lb.	.07½	.08	.07½	.08¾	.08	.08¾
Stearate, 100 lb. bbls	lb.	.16	.17	16	.18	.17	.22
Calurea, bags S. points c.i.f.	ton		88.65	.....	88.65	.....	88.65
Camphor, slabs	lb.	.36½	.37	.....	.....	.....	.....

†F. O. B. destination, 1931 prices are works prices.

		Current Market		1932 Low	1932 High	1931 Low	1931 High
Powder	lb.	.38	.40	.....	.....	.....	.....
Camwood, Bark, ground bbls.	lb.	.16	.18	.16	.18	.....	.18
Candelilla Wax, bags	lb.	....	.11	.10	.14	.13	.15
Carbitol, (See Diethylene Glycol Mono Ethyl Ether)			.....	.....	.....	.....	.....
Carbon, Decolorizing, drums c-1	lb.	.08	.15	.08	.15	.08	.15
Black, 100-300 lb cases 1c-1 NY	lb.	.06	.12	.06	.12	.06	.12
Bisulfide, 500 lb drs 1c-1 NY	lb.	.05½	.06	.05½	.06	.05½	.06
Dioxide, Liq. 20-25 lb cyl.	lb.		.06	.....	.06	.....	.06
Tetrachloride, 1400 lb drs delivered	lb.	.06¾	.07	.06¾	.07	.06¾	.07
Carnauba Wax, Flor, bags	lb.	....	.26	.25	.28	.26	.28
No. 1 Yellow, bags	lb.	.22	.22½	.21	.24	.23	.40
No. 2 N Country, bags	lb.	.14	.15	.13	.16	.15	.23
No. 2 Regular, bags	lb.	.21	.22	.20	.24	.21	.23
No. 3 N. C.	lb.	....	.12	.11	.13	.11	.11
No. 3 Chalky	lb.	....	.12	.11	.13	.11	.13½
Casein, Standard, Domestic.... ground	lb.	.07	.07½	.04¾	.07½	.06	.10
Cellosolve (see Ethylene glycol mono ethyl ether)							
Acetate (see Ethylene glycol mono ethyl ether acetate)							
Celluloid, Scraps, Ivory cs	lb.		.15	.13	.15	.13	.15
Shell, cases	lb.	.18	.20	.18	.20	.18	.20
Transparent, cases	lb.		.15	.....	.15	.....	.15
Cellulose, Acetate, 50 lb kegs.	lb.	.80	.90	.80	.90	.80	1.25
Chalk, dropped, 175 lb bbls	lb.	.03	.03¾	.03	.03¾	.03	.03¾
Precip, heavy, 560 lb cks.	lb.	.02	.03½	.02	.03½	.02	.03½
Light, 250 lb casks	lb.	.02½	.03½	.02½	.03½	.02½	.03½
Charcoal, Hardwood, lump, bulk wks	bu.	.18	.19	.18	.19	.18	.19
Willow, powd, 100 lb bbl. wks	lb.	.06	.06½	.06	.06½	.06	.06½
Wood, powd, 100 lb bbls	lb.	.04	.05	.04	.05	.04	.05
Chestnut, clarified bbls wks	lb.	.01¾	.02	.01¾	.02	.01¾	.03
25% tks wks	lb.	.01¾	.02½	.01¾	.02½	.01¾	.02½
Powd, 60%, 100 lb bgs wks.	lb.		.04¾	.....	.04¾	.....	.04¾
Powd, decolorized bgs wks.	lb.	.04¾	.05	.04¾	.06	.05½	.06
China Clay, lump, blk mines	ton	8.00	9.00	8.00	9.00	8.00	9.00
Powdered, bbls	lb.	.01	.02	.01	.02	.01¾	.02
Pulverized, bbls wks	ton	10.00	12.00	10.00	12.00	10.00	12.00
Imported, lump, bulk	ton	15.00	25.00	15.00	25.00	15.00	25.00

Chlorine

		Current Market		1932 Low	1932 High	1931 Low	1931 High
Chlorine, cyls 1c-1 wks contract	lb.	.07	.08½	.07	.08½	.07	.08½
cyls, cl., contract	lb.		.05½†	....	.05½†	.04	.04½
Liq tank or multi-car lot cyls wks contract	100 lb.		1.75	1.55	1.75	1.75	1.80
Chlorobenzene, Mono, 100 lb. drs 1c-1 wks	lb.	.06	.07½	.06	.10½	.10	.10½
Chloroform, tech, 1000 lb drs	lb.	.15	.16	.15	.16	.15	.16
Chloropicrin, comml cyls	lb.	1.00	1.35	1.00	1.35	1.00	1.35
Chrome, Green, CP	lb.	.23	.29	.23	.29	.26	.29
Commercial	lb.	.06½	.10	.06½	.11	.06½	.11
Yellow	lb.	.14	.15	.14	.18	.16	.18
Chromium, Acetate, 8% Chrome bbls	lb.	.04¾	.05¾	.04¾	.05¾	.04¾	.05¾
20° soln, 400 lb bbls	lb.		.05½	.....	.05½	.....	.05½
Fluoride, powd, 400 lb bbl	lb.	.27	.28	.27	.28	.27	.28
Oxide, green, bbls	lb.	.28	.33	.28	.35½	.34½	.35½
Coal tar, bbls	bbl.	10.00	10.50	10.00	10.50	10.00	10.50
Cobalt Oxide, black, bags	lb.	1.15	1.25	1.15	1.45	1.35	2.22
Cochineal, gray or black bag	lb.	.45	.49	.52	.57	.52	.57
Teneriffe silver, bags	lb.	.46	.49	.46	.57	.55	.57
Copper, metal, electrol	100 lb.	....	5.05	5.05	7.25	6.25	10.36
Carbonate, 400 lb bbls	lb.	.07	.15½	.07	.16½	.08½	.16½
Chloride, 250 lb bbls	lb.	.17	.18	.17	.25	.22	.25
Cyanide, 100 lb drs	lb.	.39	.40	.39	.40	.39	.42
Oxide, red, 100 lb bbls	lb.	.15	.16	.15	.16	.15	.18
Sub-acetate verdigris, 400 lb bbls	lb.	.18	.19	.18	.19	.18	.19
Sulfate, bbls c-1 wks	100 lb.		3.00	2.75	3.10	3.10	4.95
Copperas, crys and sugar bulk c-1 wks bags	ton	14.00	14.50	14.00	14.50	13.00	14.00
Cotton, Soluble, wet, 100 lb bbls	lb.	.40	.42	.40	.42	.40	.42
Cottonseed, S. E. bulk c-1	ton		26.50	.....	26.50	.....	26.50
Meal S. E. bulk	ton		.....	.....	.....	.....	.....
7% Amm., bags mills	ton	13.25	38.00	13.25	38.00	13.25	38.00
Cream Tartar, USP, 300 lb. bbls	lb.	.16	.16½	.16	.20½	.20½	.24½
Creosote, USP, 42 lb cbys	lb.	.40	.42	.40	.42	.40	.42
Oil, Grade 1 tanks	gal.	.11	.12	.11	12½	.11½	.14
Grade 2	gal.	.10	.11	.10	.11½	.10½	.12
Grade 3	gal.	.09	.11	.09	.11½	.10½	.12
Cresol, USP, drums	lb.	.10½	.11	.10½	.11	.10½	.17
Crotonaldehyde, 50 gal dr	lb.	.32	.36	.32	.36	.32	.36
Cudbear, English	lb.	.16	.17	.16	.17	.16	.17
Cutch, Rangoon, 100 lb bales.	lb.	.08¾	.09	.08¾	.12	.10	.13
Borneo, Solid, 100 lb bale	lb.	.05	06	.05	.07	.05½	.08½
Cyanamide, bags c-1 frt allowed Ammonia unit			.97½		.97½	.97½	.....
Dextrin, corn, 140 lb bags.	100 lb.		2.99	2.99	3.67	3.47	4.02
White, 140 lb bags	100 lb.		2.94	2.94	3.37	3.37	4.02
Potato Yellow, 220 lb bgs.	lb.	.08	.09	.08	.09	.08	.09
White, 220 lb bags 1c-1	lb.	.08	.09	.08	.09	.08	.09
Tapioca, 200 lb bags 1c-1	lb.	.07	.08	.07	.08¾	.08½	.08¾
Diamylphthalate, drs wks	gal.		3.80	.....	3.80	.....	3.80
Dianisidine, barrels	lb.	2.35	2.70	2.35	2.70	2.35	2.70
Dibutylphthalate, wks	lb.	.218	.22	.218	.23½	.228	.28
Dibutyltartrate, 50 gal drs	lb.	.29½	.31½	.29½	.31½	.29½	.31½
Dichloroethylether, 50 gal drs	lb.		.16	.....	.16	.....	.16

	Current Market		1932 Low	1932 High	1931 Low	1931 High
Dichloromethane, drs wks....lb.	.55	.65	.55	.65	.55	.65
Diethylamine, 400 lb drs.....lb.	2.75	3.00	2.75	3.00	2.75	3.00
Diethylcarbonate, drs.......gal.	1.85	1.90	1.85	1.90	1.85	1.90
Diethylaniline, 850 lb drs....lb.	.55	.60	.55	.60	.55	.60
Diethyleneglycol, drs........lb.	.14	.16	.14	.16	.14	.16
Mono ethyl ether, drs...lb.	.15	.16	.15	.16	.15	.16
Mono butyl ether, drs...lb.	.....	.26	.24	.30	.24	.30
Diethylene oxide, 50 gal drs..lb.	.26	.27	.....	.....	.....	.....
Diethylorthotoluidin, drs.....lb.	.64	.67	.64	.67	.64	.67
Diethyl phthalate, 1000 lb. drums.........lb.	.23	.26	.23	.26	.23	.26
Diethylsulfate, technical, 50 gal drums.........lb.	...	...	.30	.35	.30	.35
Dimethylamine, 400 lb drs....lb.	.....	2.62	.....	2.62	.....	2.62
Dimethylaniline, 340 lb drs...lb.	.25	.27	.25	.27	.25	.28
Dimethylsulfate, 100 lb drs...lb.	.45	.50	.45	.50	.45	.50
Dinitrobenzene, 400 lb bbls...lb.	.15	.16	.15	.16	.15	.16½
Dintrochlorobenzene, 400 lb bbls.........lb.	.13	.15	.13	.15	.13	.15
Dinitronaphthalene, 350 lb bbls.........lb.	.34	.37	.34	.37	.34	.37
Dinitrophenol, 350 lb bbls....lb.	.23	.24	.23	.24	.29	.30
Dinitrotoluene, 300 lb bbls....lb.	.16	.17	.16	.17	.16	.17
Diorthotolyguanidine, 275 lb bbls wks.........lb.	.42	.46	.42	.46	.42	.46
Dioxan (See Diethylene Oxide).......	.....	.....	.....	.....	.....	.....
Diphenyl.........lb.	.20	.40	.20	.40	.20	.40
Diphenylamine.........lb.	.34	.37	.34	.37	.37	.38
Diphenylguanidine, 100 lb bbl lb.	.30	.35	.30	.35	.30	.35
Dip Oil, 25%, drums........lb.	.26	.30	.26	.30	.26	.30
Divi Divi pods, bgs shipmt..ton	....	28.00	26.00	30.00	28.00	35.00
Extract.........lb.	.05	.05½	.05	.05½	.05	.05½
Egg Yolk, 200 lb cases ......lb.	.43	.44	.40	.52	.45	.58
Epsom Salt, tech, 300 lb bbls c-1 NY.........100 lb.	1.70	1.90	1.70	1.90	1.70	1.90
Ether, USP anaesthesia 55 lb. drs.........lb.	.22	.23	.22	.23	.23	.28
USP (Conc).........lb.	.09	.10	.09	.10	.09	.10
Ethyl Acetate, 85% Ester, tanks.........lb.	.....	.09	.....	.09	.06½	.09
drums.........lb.	.....	.10	.....	.10	.08	.10
Anhydrous, tanks.........lb.	.....	.10	.....	.10	.075	.119
drums.........lb.	.....	.10½	.....	.10½	.085	.121
Acetoacetate, 50 gal drs....lb.	.65	.68	.65	.68	.65	.68
Benzylaniline, 300 lb drs...lb.	.88	.90	.88	.90	.88	.90
Bromide, tech, drums......lb.	.50	.55	.50	.55	.50	.55
Carbonate, 90%, 50 gal drs gal.	1.85	1.90	1.85	1.90	1.85	1.90
Chloride, 200 lb drums.....lb.	.....	.22	.....	.22	.....	.22
Chlorocarbonate, cbys.....lb.	.....	.30	.....	.30	.....	.30
Ether, Absolute, 50 gal drs.lb.	.50	.52	.50	.52	.50	.52
Furoate, 1 lb tins.........lb.	.....	5.00	.....	5.00	.....	5.00
Lactate, drums works....lb.	.25	.29	.25	.29	.25	.29
Methyl Ketone, 50 gal drs..lb.	.....	.30	.....	.30	.....	.30
Oxalate, drums works......lb.	.37½	.55	.37½	.55	.45	.55
Oxybutyrate, 50 gal drs wks lb.	.....	.30½	.....	.30½	.....	.30½
Ethylene Dibromide, 60 lb dr..lb.	.65	.70	.65	.70	.....	.70
Chlorhydrin, 40%, 10 gal cbys. chloro, cont.........lb.	.75	.85	.75	.85	.75	.85
Dichloride, 50 gal drums....lb.	.0595	.06	.0595	.07	.05	.07
Glycol, 50 gal drs wks.....lb.	.25	.28	.25	.28	.25	.28
Mono Butyl Ether drs wks.....		.20	.20	.24	.24	.27
Mono Ethyl Ether drs wks	.15	.17	.15	.20	.17	.20
Mono Ethyl Ether Acetate dr. wks.........	.16½	.18	.16½	.23	.19½	.23
Mono Methyl Ether, drs..lb.	.21	.23	.21	.23	.21	.23
Stearate.........	.18	.18	.18	.18	.18	.18
Oxide, cyl.........lb.	.....	.75	.75	2.00	.....	2.00
Ethylidenaniline.........lb.	.45	.47½	.45	.47½	.45	.47½
Feldspar, bulk.........ton	15.00	20.00	15.00	20.00	15.00	20.00
Powdered, bulk works....ton	15.00	21.00	15.00	21.00	15.00	21.00
Ferric Chloride, tech, crystal 475 lb bbls.........lb.	.04½	.07	.04½	.07½	.05	.07½
Fish Scrap, dried, wks......unit	.....	1.85*	1.60	3.00	3.00	4.25
Acid, Bulk 7 & 3½% delivered Norfolk & Balt. basis...unit	.....	2.00†	1.40	2.40	.....	2.40
Fluorspar, 98%, bags.........	28.00	35.50	28.00	46.00	41.00	46.00

*& 10; †& 50

Formaldehyde

	Current Market		1932 Low	1932 High	1931 Low	1931 High
Formaldehyde, aniline, 100 lb.	.....	.....	.....	.....	.....	....
drums.........lb.	.37½	.42	.37½	.42	.37½	.42
USP, 400 lb bbls wks......lb.	.06	.07¾	.06	.07¾	.06	.07¾
Fossil Flour.........lb.	.02½	.04	.02½	.04	.02½	.04
Fullers Earth, bulk, mines...ton	15.00	20.00	15.00	20.00	15.00	20.00
Imp. powd c-1 bags.......ton	24.00	30.00	24.00	30.00	24.00	30.00
Furfural (tech.) drums wks,..lb.	.....	.10	.....	.10	.....	.10
Furfuramide (tech) 100 lb dr..lb.	.....	.30	.....	.30	.....	.30
Furfuryl Acetate, 1 lb tins....lb.	.....	5.00	.....	5.00	.....	5.00
Alcohol, (tech) 500 lb dr ...lb.	.....	.45	.45	.50	.....	.50
Furoic Acid (tech) 100 lb dr..lb.	.....	.35	.35	.50	.....	.50
Fusel Oil, 10% impurities...gal.	1.25	1.35	1.25	1.35	.....	1.35
Fustic, chips.........lb.	.04	.05	.04	.05	.04	.05
Crystals, 100 lb boxes.....lb.	.18	.20	.18	.20	.18	.22
Liquid 50°, 600 lb bbls.....lb.	.07	.08	.07	.08	.07	.10
Solid, 50 lb boxes.........lb.	.14	.16	.14	.16	.14	.16
Sticks.........ton	25.00	26.00	25.00	26.00	25.00	26.00
G Salt paste, 360 lb bbls.....lb.	.42	.43	.42	.50	.45	.50
Gall Extract.........lb.	.18	.20	.18	.20	.18	.20
Gambier, common 200 lb cs..lb.	.06½	.07	.06½	.07	.06½	.07
25% liquid, 450 lb bbls....lb.	.08	.10	.08	.10	.08	.10
Singapore cubes, 150 lb bg..lb.	.07¾	.08	.07¾	.09	.09½	.09
Gelatin, tech, 100 lb cases.....lb.	.45	.50	.45	.50	.45	.50
Glauber's Salt, tech, c-1 wks.........100 lb.	1.00	1.70	1.00	1.70	1.00	1.70
Glucose (grape sugar) dry 70-80° bags c-1 NY........100 lb.	3.24	3.34	3.24	3.34	3.24	3.34

	Current Market		1932 Low	1932 High	1931 Low	1931 High
Tanner's Special, 100 lb bags.........100 lb.	.....	2.36	2.36	2.75	.....	3.14
Glue, medium white, bbls....lb.	.15½	.20	.15½	.20	.16	.24
Pure white, bbls.........lb.	.18	.20	.18	.27	.20	.26
Glycerin, CP, 550 lb drs......lb.	.09¾	.10	.09¾	.11½	.11½	.14½
Dynamite, 100 lb drs......lb.	.07½	.07½	.07½	.09¾	.09	.12½
Saponification, tanks......lb.	....	.05	.04½	.06½	.06	.07½
Soap Lye, tanks.........lb.	.04½	.04¾	.03¾	.05	.04¾	.07
Glyceryl Stearate, bbls......lb.	....	.17	.....	.17	.....	.....
Graphite, crude, 220 lb bgs..ton	12.00	23.00	12.00	35.00	15.00	35.00
Flake, 500 lb bbls.........lb.	.05	.06	.05	.09	.06	.09

Gums

	Current Market		1932 Low	1932 High	1931 Low	1931 High
Gum Accroides, Red, coarse and fine 140-150 lb bags.......lb.	.03¾	.04½	.03¾	.04½	.03¾	.04½
Powd, 150 lb bags.........lb.	.06	.06½	.06	.06½	.06	.06½
Yellow, 150-200 lb bags....lb.	.18	.20	.18	.20	.18	.20
Animi (Zanzibar) bean & pea 250 lb cases.........lb.	.35	.40	.35	.40	.35	.40
Glassy, 250 lb cases.......lb.	.50	.55	.50	.55	.50	.55
Arabic, amber sorts.........lb.	.06	.06½	.....	.....	.....	.....
Asphaltum, Barbadoes (Manjak) 200 lb bags.........lb.	.04	.05	.04	.06	.04½	.12
Egyptian, 200 lb cases.......lb.	.13	.15	.13	.15	.13	.17
Gilsonite Selects, 200 lb bags.........ton	30.50	32.90	30.50	32.90	30.50	32.90
Damar Batavia standard 136, lb. cases.........lb.	.08½	.09	.08½	.09	.08½	.13
Batavia Dust, 160 lb bags.....lb.	.04	.05	.04	.05½	.05½	.06
E Seeds, 136 lb cases.......lb.	.05½	.06	.05½	.06½	.07	.08
F Splinters, 136 lb cases and bags.........lb.	.05½	.06	.05½	.06	.06½	.07½
Singapore, No. 1, 224 lb cases .lb.	.10½	.11	.10½	.11	.10½	.15
No. 2, 224 lb cases........lb.	.06	.07	.06	.07½	.07	.10
No. 3, 180 lb bags.........lb.	.04½	.05	.04½	.05	.05	.06
Benzoin Sumatra, U. S. P. 120 lb. cases.........lb.	....	.18	.18	.22	.23	.34
Copal Congo, 112 lb bags, clean opaque.........lb.	.16½	.17	.16½	.17	.16	.17
Dark, amber.........lb.	.06	.07	.06	.07	.06½	.07½
Light, amber.........lb.	.08	.08½	.08	.09	.08	.14
Water, white.........lb.	.37	.45	.37	.45	.37	.45
Mastic.........lb.	.28	.29	.34	.40	.42	.58
Manila 180-190 lb baskets						
Loba A.........lb.	.09	.10	.09	.11	.11	.13
Loba B.........lb.	.08	.08½	.08	.08½	.09	.10½
Loba C.........lb.	.07	.08	.07	.08	.08½	.10
M A Sorts.........lb.	.04¾	.05	.04¾	.05	.04¾	.06½
D B B Chips.........lb.	.05	.06	.05	.06½	.05½	.08
East Indies chips, 180 lb bags lb.	.04½	.05	.04½	.05½	.05	.05½
Pale bold, 224 lb cs......lb.	.12½	.14	.12½	.16	.15½	.16
Pale nubs, 180 lb bags...lb.	.06½	.07	.06½	.08½	.08	.09
Pontianak, 224 lb cases......						
Bold gen No. 1.........lb.	.14	.15	.14	.16	.16	.17
Gen. chips spot.........lb.	.05	.06	.05	.08	.07	.08½
Elemi, No. 1, 80-85 lb cs...lb.	.09	.09½	.09	.09½	.10	.12
No. 2, 80-85 lb cases.....lb.	.08½	.09	.08½	.09	.09½	.11½
No. 3, 80-85 lb cases.....lb.	.08	.08½	.08	.08½	.08½	.11
Kauri, 224-226 lb cases No. 1.........lb.	.20	.25	.20	.42	.42	.50
No. 2 fair pale.........lb.	.20	.25	.20	.30	.24	.29
Brown Chips, 224-226 lb. cases.........lb.	.10	.12	.10	.12	.10	.12
Bush Chips, 224-226 lb. cases.........lb.	.22	.24	.22	.24	.28	.34
Pale Chips, 224-226 lb cases.........lb.	.11	.14	.11	.14	.19	.22
Sandarac, prime quality, 200 lb bags & 300 lb casks....lb.	.23½	.23½	.23	.24	.18	.22
Tragacanth, bags.........lb.	.75	.78	.....	.....	.....	.....
Helium, 1 lit. bot.........lit.	.....	25.00	.....	25.00	.....	25.00
Hematine crystals, 400 lb bbls lb.	.10	.18	.10	.18	.14	.18
Paste, 500 bbls.........lb.	.....	.11	.....	.11	.....	.11
Hemlock 25%, 600 lb bbls wks lb.	.03½	.04½	.03	.04½	.03	.03½
Bark.........ton	.....	16.00	.....	16.00	.....	16.00
Hexalene, 50 gal drs wks......lb.	.....	.30	.30	.40	.40	.60
Hexamethylenetetramine, drs lb.	.46	.47	.46	.47	.46	.50
Hoof Meal, f.o.b. Chicago...unit	.75	.80	.75	1.35	1.35	2.50
South Amer. to arrive....unit	.....	1.45	1.25	1.65	1.80	2.70
Hydrogen Peroxide, 100 vol, 140 lb cbys.........lb.	.20	.21	.20	.21	.21	.24
Hydroxyamine Hydrochloride lb.	.....	3.15	.....	3.15	.....	3.15
Hypernic, 51°, 600 lb bbls....lb.	.11	.12	.11	.12	.11	.15

Indigo

	Current Market		1932 Low	1932 High	1931 Low	1931 High
Indigo Madras, bbls.........lb.	1.25	1.30	1.25	1.30	1.25	1.30
20% paste, drums.........lb.	.15	.18	.15	.18	.15	.18
Synthetic, liquid.........lb.	.....	.12	.....	.12	.....	.12
Iron Chloride. see Ferric or Ferrous						
Iron Nitrate, kegs.........lb.	.09	.10	.09	.10	.09	.10
Coml, bbls.........100 lb.	2.50	3.25	2.50	3.25	2.50	3.25
Oxide, English.........lb.	.04	.10	.04	.10	.10	.12
Red, Spanish.........lb.	.02	.02½	.02	.03½	.02½	.03½
Isopropyl Acetate, 50 gal drs gal.	.85	.90	.85	.90	.85	.90
Japan Wax, 224 lb cases.....lb.	.....	.06	.06	.09	.07¾	.11
Kieselguhr, 95 lb bgs NY....... Brown.........ton	60.00	70.00	60.00	70.00	60.00	70.00
Lead Acetate, bbls wks...100 lb.	9.00	9.50	9.00	10.00	9.50	11.00
White crystals, 500 lb bbls wks.........100 lb.	10.00	10.50	10.00	11.00	10.50	12.25
Arsenate, drs 1c-1 wks.....lb.	.09½	.13	.09½	.13	.10	.14
Dithiofuroate, 100 lb dr....lb.	.....	1.00	.....	1.00	.....	1.00
Metal, c-1 NY.........100 lb.	2.87	3.00	2.70	3.75	3.75	4.60
Nitrate, 500 lb bbls wks....lb.	.10½	.14	.10½	.14	.12	.14
Oleate, bbls.........lb.	.17½	.18	.17½	.18	.17½	.18

Prices Current

	Current Market		1932 Low	1932 High	1931 Low	1931 High
Lead Oxide Litharge, 500 lb. bbls.....lb.	.05½	.06	.05½	.07	.06¾	.08
Red, 500 lb bbls wks....lb.	.06½	.07	.06¼	.07	.06¾	.08¼
White, 500 lb bbls wks...lb.	.06	.07	.06	.07	.06¼	.08
Sulfate, 500 lb bbls wk...lb.	.05½	.05¾	.05½	.06	.05¾	.07
Leuna saltpetre, bags c.i.f.....ton	.....	Nom.	.....	Nom.	.....	57.60
S. points c.i.f.............ton	.....	Nom.	.....	Nom.	.....	57.90
Lime, ground stone bags.....ton	.....	4.50	.....	4.50	.....	4.50
Live, 325 lb bbls wks...100 lb.	.....	1.05	.....	1.05	.....	1.05
Lime Salts, see Calcium Salts						
Lime-Sulfur soln bbls.......gal.	.15	.17	.15	.17	.15	.17
Lithopone, 400 lb bbls lc-1 wks ....lb.	.04¾	.05	.04¾	.05	.04¾	.05
Logwood, 51°, 600 lb bbls....lb.	.05	.08	.05	.08	.07	.08
Chips, 150 lb bags.........lb.	.03	.03½	.03	.03½	.03	.03½
Solid, 50 lb boxes.........lb.	.08	.12½	.08	.12½	.12	.12½
Sticks..................ton	24.00	26.00	24.00	26.00	24.00	26.90
Madder, Dutch.............lb.	.22	.25	.22	.25	.22	.25
Magnesite, calc, 500 lb bbl...ton	50.00	60.00	50.00	60.00	50.00	60.00

Magnesium

	Current Market		1932 Low	1932 High	1931 Low	1931 High
Magnesium Carb, tech, 70 lb. bags NY.............lb.	.05¾	.06¼	.05¾	.06½	.06	.06½
Chloride flake, 375 lb. drs c-1 wks..............ton	35.00	36.00	35.00	36.00	35.00	36.00
Imported shipment.....ton	31.75	33.00	31.75	33.00	31.75	33.00
Fused, imp., 900 lb bbls NY ton	.....	31.00	.....	31.00	.....	31.00
Fluosilicate, crys, 400 lb bbls wks..............lb.	.10	10½	.10	.10½	.10	.10½
Oxide, USP, light, 100 lb bbls ....lb.	.....	.42	.....	.42	.....	.42
Heavy, 250 lb bbls......lb.	.....	.50	.....	.50	.....	.50
Peroxide, 100 lb cs........lb.	1.00	1.25	1.00	1.25	1.00	1.25
Silicofluoride, bbls.........lb.	.09¾	.10¼	.09¾	.10¼	.09¾	.10¼
Stearate, bbls............lb.	.24	.26	.24	.26	.24	.26
Manganese Borate, 30%, 200 lb bbls...............lb.	.15	.16	.15	.19	.....	.19
Chloride, 600 lb casks......lb.	.07	.08	.07	.08½	.07½	.08½
Dioxide, tech (peroxide) drs lb.	.03½	.06	.03½	.06	.03½	.06
Manganese Ore, cents per unit...	.18	.23	.18	.23	.....	.....
Sulfate, 550 lb drs NY.....lb.	.07	.08	.07	.08	.07	.08
Mangrove 55%, 400 lb bbls...lb.	.....	.04	.....	.04	.03½	.04
Bark, African............ton	21.00	22.00	21.00	25.00	23.00	29.75
Marble Flour, bulk.........ton	14.00	15.00	14.00	15.00	14.00	15.00
Mercurous chloride.........lb.	.82	.87	.82	.93	.93	2.05
Mercury metal......76 lb flask	.....	49.00	47.00	74.50	64.00	106.00
Meta-nitro-aniline..........lb.	.67	.69	.67	.69	.67	.69
Meta-nitro-para-toluidine 200 lb. bbls...............lb.	1.40	1.55	1.40	1.55	1.40	1.55
Meta-phenylene-diamine 300 lb. bbls...............lb.	.80	.84	.80	.84	.80	.84
Meta-toluene-diamine, 300 lb. bbls...............lb.	.67	.69	.67	.69	.67	.69
Methanol, (Wood Alcohol)......						
95% tanks............gal.	.33	.35	.33	.35	.33	.37
97% tanks............gal.	.34	.39	.34	.39	.34	.43
*Pure, Synthetic drums cars gal.	.....	.37½	.37½	.41½	.39½	.42½
*Synthetic tanks..........gal.	.....	.35½	.....	.35½	.35½	.40½
Methyl Acetate ,drums 82% gal.	.12	.13	.12	.17½	.....	Nom.
99%................gal.	.....	.15	.....	.15	.....	.....
Acetone, drums..........gal.	.47	.49	.47	.55	50	.70
Hexyl Ketone, pure.....lb.	.....	1.20	.....	1.20	.....	.....
Anthraquinone...........lb.	.85	.95	.85	95	.85	.95
Cellosolve, (See Ethylene Glycol Mono Methyl Ether)	.....	.....	.....	.....	.....	.....
Chloride, 90 lb cyl........lb.	.45	.45	.45	.45	.45	.45
Furoate, tech., 50 gal. dr...lb.	.....	.50	.....	50	.....	50
Mica, dry grd. bags wks.....lb.	65.00	80.00	65.00	80.00	65.00	80.00
Michler's Ketone, kegs.......lb.	.....	3.00	.....	3.00	.....	3.00
Monochlorobenzene, drums see, Chlorobenzene, mono.....lb.						
Monomethylparaminosulfate 100 lb drums..............lb.	3.75	4.00	3.75	4.00	3.75	4.00
Montan Wax, crude, bags....lb.	.05	.06	.05	.07	.05½	.07
Myrobalans 25%, liq bbls....lb.	.03¾	.04¼	.03¾	.04¼	.03¾	.04¼
50% Solid, 50 lb boxes.....lb.	.05	.05½	.05	.05½	.05	.05½
J1 bags...............ton	34.00	35.00	34.00	35.00	34 00	35.00
J2 bags...............ton	16.00	16.50	15.25	18.50	15.50	22.50
R2 bags...............ton	15.50	16.00	14.75	17.50	16.00	20.00
Naphtha, v.m.& p. (deodorized) tanks..............gal.	.09½	.10	.09½	.10	.....	.....
Naphthalene balls, 250 lb bbls wks...............lb.	.....	.05½	.03¾	05½	.03¾	.04¾
Crushed, chipped bgs wks...lb.	.....	.04½	.....	.04½	.....	.04
Flakes, 175 lb bbls wks.....lb.	.....	.04¾	.03¾	.04¾	.....	.03¾
Nickel Chloride, bbls........lb.	.17	.18	.18	.20	.18	.21
Oxide, 100 lb kegs NY.....lb.	.35	.37	.35	.40	.37	.40
Salt bbl. 400 bbls lb NY...lb.	.11	.13	.10½	.13	.10½	.13
Single, 400 lb bbls NY.....lb.	.11	.12	.10½	.12	.10½	.12
Metal ingot..............lb.	.35	.35	.35	.35	.35	.....
Nicotine, free 40%, 8 lb tins, cases...............lb.	1.25	1.30	1.25	1.30	1.25	1.30
Sulfate, 55 lb. drums......lb.	.74½	.86	.74½	.....	.....	.....
Nitre Cake, bulk...........ton	10.00	12.00	10.0C	12.00	12.00	14.00
Nitrobenzene, redistilled, 1000 lb drs wks.............lb.	.09	.09½	.09	.09½	.09	.09½
Nitrocellulose, c-l-l-cl, wks....lb.	.25	.36	.25	.36	.25	.36
Nitrogenous Material, bulk.unit	.....	1.50	1.35	1.55	1.50	2.70
Nitronaphthalene, 550 lb bbls.lb.	.....	.25	.....	.25	.....	.25
Nitrotoluene, 1000 lb drs wks.lb.	.14	.15	.14	.15	.14	.15
Nutgalls Aleppy, bags.......lb.	.....	.18	.....	.18	.16	.18
Chinese, bags.............lb.	.17	.18	.17	.18	.17	.18

*delivered basis (east of Miss. River)

	Current Market		1932 Low	1932 High	1931 Low	1931 High
Oak Bark, ground..........ton	30.00	35.00	30.00	35.00	30.00	35.00
Whole................ton	20.00	23.00	20.00	23.00	20.00	23.00
Orange-Mineral, 1100 lb casks NY................lb.	.10¼	.10¾	.09½	.10¾	10½	.13
Orthoaminophenol, 50 lb kgs..lb.	2.15	2.25	2.15	2.25	2.15	2.25
Orthoanisidine, 100 lb drs....lb.	2.50	2.60	2.50	2.60	2.50	2.60
Orthochlorophenol, drums....lb.	.50	.65	.50	.65	.50	.65
Orthocresol, drums..........lb.	.13	.15	.13	.22	.18	.25
Orthodichlorobenzene, 1000 lb. drums................lb.	.07	.10	.07	.10	.07	.10
Orthonitrochlorobenzene, 1200 lb drs wks............lb.	.28	.29	.28	.29	.28	.33
Orthonitrotoluene, 1000 lb drs wk..................lb.	.16	.18	.16	.18	.16	.18
Orthonitrophenol, 350 lb dr...lb.	.85	.90	.85	.90	.85	.90
Orthotoluidine, 350 lb bbl 1c-1 lb.	.20	.22	.20	.22	.25	.30
Orthonitroparachlorphenol, tins ....lb.	.70	.75	.70	.75	.70	.75
Osage Orange, crystals.......lb.	.16	.17	.16	.17	.16	.17
51 deg. liquid.............lb.	.06	.06½	.06	.07½	.07	.07½
Powdered, 100 lb bags.....lb.	.14½	.15	.14½	.15	.14½	.15
Paraffin, refd, 200 lb cs slabs						
123-127 deg. M. P.........lb.	.02¾	.02¾	.02¾	.03	.03½	.03
128-132 deg. M. P.........lb.	.03¼	.03¼	.....	.03¼	.03¼	.03¼
133-137 deg. M. P.........lb.	.04½	.04¾	.04	.04¾	.04¾	.04¾
Para Aldehyde, 110-55 gal drs.lb.	.20½	.23	.20½	.23	.20½	.23
Aminoacetanilid, 100 lb bg..lb.	.52	.60	.52	.60	.52	.60
Aminohydrochloride, 100 lb. kegs...............lb.	1.25	1.30	1.25	1.30	1.25	1.30
Aminophenol, 100 lb kegs...lb.	.78	.80	.78	.80	.82	.86
Chlorophenol, drums.......lb.	.50	.65	.50	.65	.50	.65
Coumarone, 330 lb drums..lb.	.....	.....	.....	.....	.....	.....
Cymene, refd, 110 gal dr..gal.	2.25	2.50	2.25	2.50	2.25	2.50
Dichlorobenzene, 150 lb bbls wks...............lb.	.15½	.16	.15½	.16	.15½	.20
Nitroacetanilid, 300 lb bbls.lb.	.45	.52	.45	.52	.45	.55
Nitroaniline, 300 lb bbls wks ....lb.	.48	.55	.48	.55	.48	.55
Nitrochlorobenzene, 1200 lb drs wks...............lb.	.23	.26	.23	.26	.23	.26
Nitro-orthotoluidine, 300 lb. bbls...............lb.	2.75	2.85	2.75	2.85	2.75	2.85
Nitrophenol 185 lb bbls....lb.	.45	.50	.45	.50	.45	.50
Nitrosodimethylaniline, 120 lb. bbls...............lb.	.92	.94	.92	.94	.92	.94
Nitrotoluene, 350 lb bbls...lb.	.29	.31	.29	.31	.29	.31
Phenylenediamine, 350 lb bbls ....lb.	1.15	1.20	1.15	1.20	1.15	1.20
Toluenesulfonamide, 175 lb bbls...............lb.	.70	.75	.70	.75	.70	.75
Toluenesulfonchloride, 410 lb bbls wks............lb.	.20	.22	.20	.22	.20	.22
Toluidine, 350 lb bbls wk..lb.	.42	.43	.42	.43	.40	.44
Paris Green, Arsenic Basis						
100 lb kegs.............lb.	.....	.24	.24	.27	.....	.27
250 lb kegs.............lb.	.....	.23	.23	.25	.25	.26
Persian Berry Ext., bbls.....lb.	.25	Nom	.25	Nom.	.25	Nom.
Pentasol (see Alcohol, Amyl)...						
Pentasol Acetate (see Amyl Acetate)..................						
Petrolatum, Green, 300 lb bbl. lb.	.02	.02¼	.02	.02¼	.02	.02¼
Phenol, 250-100 lb drums....lb.	.14½	.15	.14½	.15	.14½	.15
Phenyl-Alpha-Naphthylamine, 100 lb kegs.............lb.	.....	1.35	.....	1.35	.....	1.35
Phenylhydrazine Hydrochloride ....lb.	2.90	3.00	2.90	3.00	2.90	3.00

Phosphate

	Current Market		1932 Low	1932 High	1931 Low	1931 High
Phosphate Acid (see Superphosphate)						
Phosphate Rock, f.o.b. mines						
Florida Pebble, 68% basis..ton	3.10	3.25	3.10	3.25	3.10	3.25
70% basis............ton	3.75	3.90	3.75	3.90	3.75	3.90
72% basis............ton	4.25	4.35	4.25	4.35	4.25	4.35
75-74% basis..........ton	5.25	5.50	5.25	5.50	5.25	5.50
75% basis............ton	.....	5.75	.....	5.75	.....	5.75
77-80% basis..........ton	.....	6.25	.....	6.25	.....	6.25
Tennessee, 72% basis.....ton	.....	5.00	.....	5.00	.....	5.00
Phosphorous Oxychloride 175 lb cyl...............lb.	.18	.20	.18	.20	.18	.20
Red, 110 lb cases.......lb.	.43	.46	.43	.46	.42	.46
Yellow, 110 lb cases wks.lb.	.27½	.32	.27½	.37½	.31	.37½
Sesquisulfide, 100 lb cs.....lb.	.38	.44	.38	.44	.38	.44
Trichloride, cylinders......lb.	.18	.20	.18	.20	.18	.20
Phthalic Anhydride, 100 lb bbls wks...............lb.	.15	.16	.15	.16	.15	.16
Pigments Metallic, Red or brown bags, bbls, Pa. wks.....ton	37.00	45.00	37.00	45.00	37.00	45.00
Pine Oil, 55 gal drums or bbls						
Destructive dist..........lb.	.59	.62	.59	.63	.61	.64
Prime bbls.............bbl.	8.00	10.60	8.00	10.60	8.00	10.60
Steam dist. bbls..........gal.	.59	.61	.54	.61	.54	.70
Pitch Hardwood.............. wks.................ton	20.00	25.00	20.00	35.00	5.00	45.00
Plaster Paris, tech, 250 lb bbls ....bbl.	3.30	3.50	3.30	3.50	3.30	3.50
Platinum, Refined..........oz.	32.00	37.00	32.00	38.00	38.00	38.00
Pontol, tanks..........per gal.	.....	.54	.54	.54	.....	.....

	Current Market	1932 Low	1932 High	1931 Low	1931 High
Potash, Caustic, wks, solid...lb.	.06¼	.06¾	.06¼	.06¾	.06¼	.06¾
flake...lb.	.0705	.08	.0705	.08	.0705	.08
Potash Salts, Rough Kainit						
12.4% basis bulk...ton	.....	9.20	.....	9.20	.....	9.20
14% basis...ton	.....	9.70	.....	9.70	.....	9.70
Manure Salts...						
20% basis bulk...ton	.....	12.00	12.00	12.65	.....	12 65
30% basis bulk...ton	.....	19.15	.....	19.15	.....	19.15
Potassium Acetate...lb.	.27	.28	.27	.28	.27	.30
Potassium Muriate, 80% basis bags...ton	.....	37.15	.....	37.15	.....	37.15
Pot. & Mag. Sulfate, 48% basis bags...ton	.....	27.80	.....	27.80	.....	27.80
Potassium Sulfate, 90% basis bags...ton.	....	47.50	47.50	48.25	....	48.25
Potassium Bicarbonate, USP, 320 lb bbls...lb.	.07½	.09	.07½	.09	.07½	.10
Bichromate Crystals, 725 lb casks...lb.	.07½	.08	.07	.08½	.08	.09
Powd., 725 lb cks wks...lb.	.13	.13½	.13	13½	.13	.13
Binoxalate, 300 lb bbls...lb.	.14	.17	.14	.17	.14	.17
Bisulfate, 100 lb kegs...lb.	.16	.30	.16	.30	.16	.30
Carbonate, 80-85% calc. 800 lb casks...lb.	.....	.05	.0475	.05	.04¾	.07¼
Chlorate crystals, powder 112 lb keg wks...lb.	.08	.08½	.08	.08½	.08	.08½
Chloride, crys bbls...lb.	.04	.04¾	.04	.04¾	.04	.06
Chromate, kegs...lb.	.23	.28	.23	.28	.23	.28
Cyanide, 110 lb. cases...lb.	.50	.57½	.50	.57½	.55	.57½
Metabisulfite, 300 lb. bbl...lb.	.10½	.11	.10½	.13	.11	.13
Oxalate, bbls...lb.	.16	.24	.16	.24	.20	.24
Perchlorate, casks wks...lb.	.09	.11	.09	.11	.09	.12
Permanganate, USP, crys 500 & 100 lb drs wks...lb.	.16	.16½	.16	.16½	.16	.16½
Prussiate, red, 112 lb keg...lb.	.....	.38½	.....	.38½	.35	.40
Yellow, 500 lb casks...lb.	.16½	.17	.16½	.21	.18½	.21
Tartrate Neut, 100 lb keg...lb.	.....	.21	.....	.21	.....	.21
Titanium Oxalate, 200 lb bbls...lb.	.21	.23	.21	.23	.21	.23
Propane, group 3, tanks...		.07	.....	.....	.....	.....
Propyl Furoate, 1 lb tins...lb.	.....	5.00	.....	5.00	.....	5.00
Pumice Stone, lump bags...lb.	.04	.05	.04	.05	.04	.05
250 lb bbls...lb.	.04½	.06	.04½	.06	.04½	.06
Powdered, 350 lb bags...lb.	.02½	.03	.02½	.03	.02½	03
Putty, commercial, tube...100 lb.	2.00	2.25	2.00	2.45	2.35	2.45
Linseed Oil, kegs...100 lb.	3.40	3.50	3.40	4.75	4.00	4.75
Pyridine, 50 gal drums...gal.	.85	.95	.85	1.25	1.50	1.75
Pyrites, Spanish cif Atlantic ports bulk...unit	.12	.13	.12	.13	.12	.13½
Quebracho, 35% liquid tks...lb.	.02	.02¼	.02	.03	.02¾	.04
450 lb bbls c-1...lb.	.02½	.02¾	.02½	.03¼	.03½	.03¾
35% Bleaching, 450 lb bbl...lb.	.04	.05½	.04	.05½	.04	.05½
Solid, 63%, 100 lb bales cif...lb.	.02	.02½	.02	.02½	.02½	.05½
Clarified, 64%, bales...lb.	.02½	.03	.02½	.03½	.03½	.05½
Quercitron, 51 deg liquid 450 lb bbls...lb.	.05½	.06	.05½	.06	.05½	.06
Solid, 100 lb boxes...lb.	.09½	.13	.09½	.13	.09½	.13
Bark, Rough...ton	.....	14.00	.....	14.00	.....	14.00
Ground...ton	34.00	35.00	34.00	35.00	34.00	35.00
R Salt, 250 lb bbls wks...lb.	.40	.44	.40	.44	.40	.44
Red Sanders Wood, grd bbls. lb.	.....	.18	.....	.18	.....	.18
Resorcinol Tech, cans...lb.	.65	.70	.65	.70	.65	1.25
Rosin Oil, 50 gal bbls, first run...gal.	.42	.43	.41	.45	.47	.58
Second run...gal.	.46	.47	.45	.51	.51	.61

Rosin

	Current Market	1932 Low	1932 High	1931 Low	1931 High
Rosins 600 lb bbls 280 lb...unit ex. yard N. Y.					
B	....	2.95	2.95	3.65	3.25	4.95
D	....	3.20	3.15	3.75	3.35	5.50
E	....	3.60	3.37½	4.00	3.45	5.90
F	....	3.77½	3.40	4.15	3 70	6.20
G	....	3.77½	3.45	4.15	3.75	6.25
H	3.85	4.00	3.45	4.20	3.80	6.30
I	....	3.87½	3.47½	4.25	3.85	6.35
K	4.35	4.55	3.60	4.65	4.10	6.45
M	....	4.85	4.20	5.25	4.20	6.70
N	....	5.10	4.65	6.05	4.85	6.95
WG	5.65	5.80	5.25	6.45	6 15	8.15
WW	....	6.35	5.85	6.65	6.45	8.90
Rotten Stone, bags mines...ton	23.50	24.00	20.00	23.00	24.00	20.00
Lump, imported, bbls...lb.	.05	.07	.05	.07	.05	.07
Selected bbls...lb.	.09	.12	.09	.12	.09	.12
Powdered, bbls...lb.	.02	.05	.02	.05	.02	.05
Sago Flour, 150 lb bags...lb.	.04½	.05	.04½	.05	.04½	.05
Sal Soda, bbls wks...100 lb.	.90	1.00	.90	1.00	.....	1.00
Salt Cake, 94-96% c-1 wks...ton	13.00	14.00	13.00	15.50	14.00	19.00
Chrome...ton	12.00	13.00	12.00	14.50	13.00	17.00
Saltpetre, double refd granular 450-500 lb bbls...lb.	.06	.06¾	.06	.06¾	.06	.06¾
Satin, White, 500 lb bbls...lb.	.....	.01½	.....	.01½	.....	.01½
Shellac Bone dry bbls...lb.	.18	.19	.16	.26	.26	.29
Garnet, bags...lb.	.15	.16	.15	.20	.19	.26
Superfine, bags...lb.	.10	.10½	.10	.14	.16	.22
T. N. bags...lb.	.09½	.12	.09	.13	.14½	.17
Schaeffer's Salt kegs...lb.	.48	.50	.48	.50	.53	.57
Silica, Crude, bulk mines...ton	8.00	11.00	8.00	11.00	8.00	11.00
Refined, floated bags...ton	22.00	30.00	22.00	30.00	22 00	30.00
Air floated bags...ton	.....	32.00	.....	32.00	.....	32.00
Extra floated bags...ton	30.00	35.00	30.00	40.00	32.00	40.00

	Current Market	1932 Low	1932 High	1931 Low	1931 High
Soapstone, Powdered, bags f.o.b. mines...ton	15.00	22.00	15.00	22.00	15.00	22.00

Soda

	Current Market	1932 Low	1932 High	1931 Low	1931 High
Soda Ash, 58% dense, bags c-1 wks...100 lb.	.....	1.17½	1.17½	.....	.....	.....
58% light, bags...100 lb.	.....	1.20	1.15	1.20	.....	1.15
Contract, bags c-1 wks...100 lb.	.....	1.20	1.15	1.20	1.15	1.15
Soda Caustic, 76% grnd & flake drums...100 lb.	2.95	3.00	2.90	3.00	.....	2.90
76% solid drs...100 lb.	.....	2.55	2.50	2.55	.....	2.50
Sodium Abietate, drs...lb.	.....	.03	.....	.03	.....	.....
Acetate, tech...450 lb. bbls wks...lb.	.....	.05	.04½	.05	.04½	.06
Alignate, drs...lb.	.....	.50	.....	.50	.....	.....
Arsenate, drums...lb.	.25	.35	.25	.35	.25	.35
Arsenite, drums...gal.	.50	.75	.50	.75	.50	.75
Bicarb, 400 lb bbl...100 lb.	.....	2.25	.....	2.25	2.35	2.35
Bichromate, 500 lb cks wks lb.	.044	.04¾	.044	.05¾	.05	.07½
Bisulfite, 500 lb bbl wks...lb.	.....	.04	.....	.04	.....	.04
Chlorate, wks...lb.	.05¾	.07¾	.05¾	.07¾	.05¾	.07¾
Chloride, technical...ton	12.00	13.00	12.00	13.00	12.00	13.00
Cyanide, 96-98%, 100 & 250 lb drums wks...lb.	.15½	.16	.15½	.17	.16	.17
Fluoride, 300 lb bbls wks...lb.	.07	.07½	.07	.07½	.07	.08½
Hydrosulfite, 200 lb bbls f.o.b. wks...lb.	.22	.24	.22	.24	.22	.24
Hypochloride solution, 100 lb. cbys...lb.	.....	.05	.....	.05	.....	.05
Hyposulfite, tech, pea cyrs 375 lb bbls wks...100 lb.	2.40	3.00	2.40	3.00	2.40	3.00
Technical, regular crystals 375 lb bbls wks...100 lb.	2.40	2.65	2.40	2.65	2.40	2.65
Metanilate, 150 lb bbls...lb.	.44	.45	.44	.45	.44	.45
Metasilicate, c-1, wks...100 lb.	2.85	3.25	2.85	4.00	.....	4.00
Monohydrate, bbls...lb.	.....	.02½	.....	.02½	.....	.02½
Naphthionate, 300 lb bbl...lb.	.52	.54	.52	.54	.52	.54
Nitrate, 92%, crude, 200 lb. bags c-1 NY...100 lb.	.....	1.26	1.185	1.73½	1.73½	2.07
Nitrite, 500 lb bbls spot...lb.	.07½	.08	.07½	.08	.07½	.08
Orthochlorotoluene, sulfonate, 175 lb bbls wks...lb.	.25	.27	.25	.27	.25	.27
Perborate, 275 lb bbls...lb.	.17	.19	.17	.20	.18	.20
Phosphate, di-sodium, tech. 310 lb bbls...100 lb.	2.00	2.10	2.00	2.75	2.50	3.00
tri-sodium, tech, 325 lb bbls...100 lb.	2.15	2.50	2.15	3.20	3.15	3.50
Picramate, 160 lb kegs...lb.	.69	.72	.69	.72	.69	.72
Prussiate, Yellow, 350 lb bbl wks...lb.	.11½	.12	.11½	.12	.11½	.12
Pyrophosphate, 100 lb keg...lb.	.15	.20	.15	.20	.15	.20
Silicate, 60 deg 55 gal drs, wks...100 lb.	1.65	1.70	1.65	1.70	1.65	1.70
40 deg 55 gal drs, wks...100 lb.	.....	.75	.....	.75	.75	1.00
Siljcofluoride, 450 lb bbls NY...lb.	.06	.06½	.05½	.06½	.04	.04½
Stannate, 100 lb drums...lb.	.17½	.18	.17	.19	.18	.26
Stearate, bbls...lb.	.20	.25	.20	.25	.20	.25
Sulfanilate, 400 lb bbls...lb.	.16	.18	.16	.18	.16	.18
Sulfate Anhyd, 550 lb bbls c-1 wks...lb.	.02	.02½	.02	.02½	.02	.02½
Sulfide, 80% crystals, 440 lb bbls wks...lb.	.02½	.02¾	.02½	.02¾	.02½	.02¾
62% solid, 650 lb drums lc-1 wks...lb.	.03	.03½	.03	.03½	.03	.03½
Sulfite, crystals, 400 lb bbls wks...lb.	.03	.03½	.03	.03½	.03	.03½
Sulfocyanide, bbls...lb.	.28	.35	.28	.35	.28	.35
Tungstate, tech, crystals, kegs...lb.	.60	.70	.60	.88	.80	.88
Spruce, 25% liquid, bbls...lb.	.....	.01½	.....	.01	.01	.01½
25% liquid, tanks wks...lb.	.....	.01	.....	.01	.....	.01
50% powd, 100 lb bag wks...lb.	.02	.02½	.02	.02½	.02	.02½
Starch, powd, 140 lb bags...100 lb.	.....	2.29	2.29	2.67	2.57	3.20
Pearl, 140 lb bags...100 lb.	.....	2.19	2.19	2.84	2.57	3.00
Potato, 200 lb bags...lb.	.03½	.04	.03½	.06	.05½	.06
Imported bags...lb.	.04½	.05	.04	.06½	.05½	.06½
Soluble...lb.	.08	.08½	.08	.08½	.08	.08½
Rice, 200 lb bbls...lb.	.07½	.08½	.07½	.10	.09	.10
Wheat, thick bags...lb.	.06	.06½	.06	.07	.06½	.07
Thin bags...lb.	.09½	.10	.09½	.10	.09½	.10
Strontium carbonate, 600 lb bbls wks...lb.	.07½	.07½	.07½	.07½	.07½	.07½
Nitrate, 600 lb bbls NY...lb.	.07	.07½	.07	.07½	.07	.09½
Peroxide, 100 lb drs...lb.	.....	1.25	.....	1.25	.....	1.25
Sulfur Brimstone, broken rock, 250 lb bag c-1...100 lb.	.....	2.05	.....	2.05	.....	2.05
Crude, f. o. b. mines...ton	18.00	19.00	18.00	19.00	18.00	19.00
Flour for dusting 99½%, 100 lb bags c-1 NY...100 lb.	.....	2.40	.....	2.40	.....	2.40
Heavy bags c-1...100 lb.	.....	2.50	.....	2.50	.....	2.50
Flowers, 100%, 155 lb bbls c-1 NY...100 lb.	.....	3.45	.....	3.45	.....	3.45
Roll, bbls lc-1 NY...100 lb.	2.65	2.85	2.65	2.85	2.65	2.85
Sulfur Chloride, red, 700 lb drs wks...lb.	.05	.05½	.05	.05½	.05	.05½
Yellow, 700 lb drs wks...lb.	.03½	.04½	.03½	.04½	.03½	.04½
Sulfur Dioxide, 150 lb cyl...lb.	.07	.07½	.07	.07½	.07	.07½
Extra, dry, 100 lb cyl...lb	.10	.12	.10	.12	.10	.12
Sulfuryl Chloride...lb.	.15	.40	.15	.40	.15	.40

Prices Current

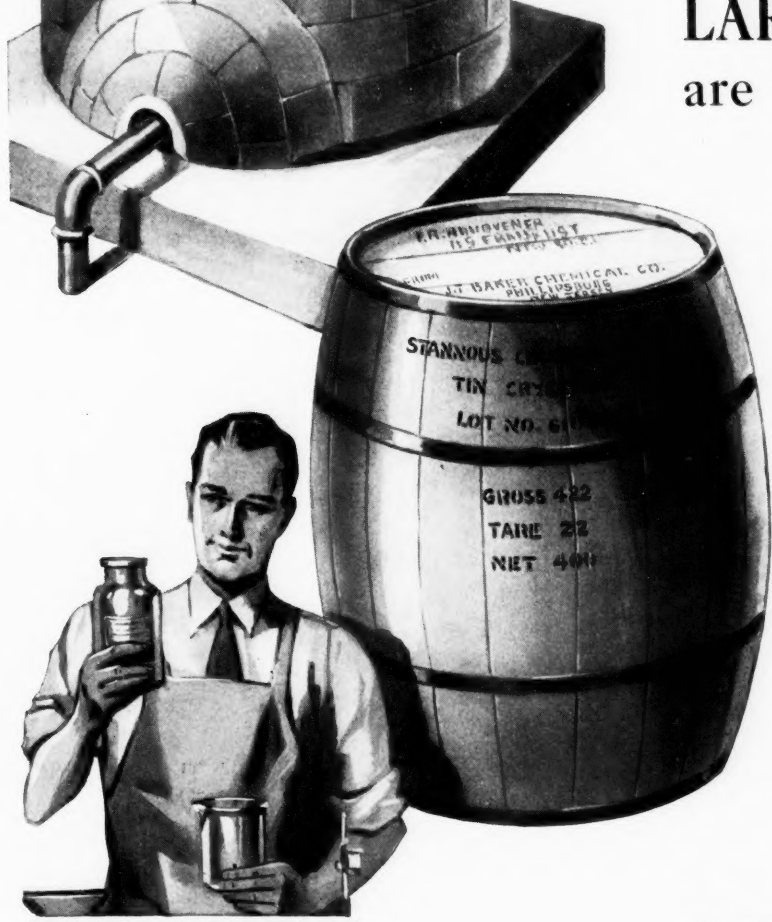
	Current Market		1932 Low	1932 High	1931 Low	1931 High
Talc, Crude, 100 lb bgs NY..ton	12.00	15.00	12.00	15.00	12.00	15.00
Refined, 100 lb bgs NY..ton	16.00	18.00	16.00	18.00	16.00	18.00
French, 220 lb bags NY....ton	18.00	22.00	18.00	22.00	18.00	22.00
Refined, white, bags....ton	35.00	40.00	35.00	40.00	35.00	40.00
Italian, 220 lb bags NY...ton	40.00	50.00	40.00	50.00	40.00	50.00
Refined, white bags.....ton	50.00	55.00	50.00	55.00	50.00	55.00
Superphosphate, 16% bulk, wks.....ton	.....	7.00	7.00	8.00	7.50	9.00
Triple bulk, wks.........unit	.....	.65	.....	.65	.....	.65
Tankage Ground NY.......unit	.....	1.60*	1.30	1.50	1.50	3.20
High grade f.o.b. Chicago.unit	.....	1.00	1.00	1.80	1.50	3.25
South American cif......unit	.....	1.80	1.80	2.25	2.25	3.40
Tapioca Flour, high grade bgs.lb	.03½	.05	.03½	.05	.03½	.05
Medium grade, bags.....lb.	.03	.04	.03	04	.03	.04
Tar Acid Oil, 15%, drums...gal.	.21	.22	.21	.22	.21	.25
25% drums...........gal.	.23	.24	.23	.24	.23	.28
Terra Alba Amer. No. 1, bgs or bbls mills.........100 lb.	1.15	1.75	1.15	1.75	1.15	1.75
No. 2 bags or bbls...100 lb.	1.50	2.00	1.50	2.00	1.50	2.00
Imported bags...........lb.	.01⅛	.01¼	.01⅛	.01¼	.01⅛	.01¼
Tetrachlorethane, 50 gal dr...lb.	.08	.09	.08	.09½	.09	.09½
Tetralene, 50 gal drs wks.....lb.	.12	.13	.12	.20	.....	.20
Thiocarbanilid, 170 lb bbl....lb.	.25	.28½	.25	.28½	.25	.28½
Tin..........................						
Crystals, 500 lb bbls wks...lb.	.....	.24	.22	.25	.23	.28½
Metal Straits NY.........lb.	.....	.229	.211	.24½	.21¾	.27
Oxide, 300 lb bbls wks.....lb.	.....	.26	.23	.26½	.23	.29
Tetrachloride, 100 lb drs wks ....lb.	.....	.1442	.14	.1735	.1605	.19½
Titanium Dioxide 300 lb bbl...lb.	.17¼	.19¼	.17¼	.21	.20½	.22
Calcium Pigment, bbls.......lb.	.06¼	.06½	.06¼	.07¾	.06½	.07¾
Toluene, 110 gal drs........gal.	.....	.35	.....	.35	.34	.35
8000 gal tank cars wks....gal.	.....	.30	.....	.30	.27	.30
Toluidine, 350 lb bbls........lb.	.88	.89	.88	.89	.88	.94
Mixed, 900 lb drs wks.....lb.	.27	.32	.27	.32	.27	.32
Toner Lithol, red, bbls.......lb.	.90	.95	.90	.95	.90	.95
Para, red, bbls...........lb.	.....	.80	.....	.80	.....	.80
Toluidine...............lb.	1.50	1.55	1.50	1.55	1.50	1.55
Triacetin, 50 gal drs wks.....lb.	.32	.36	.32	.36	.32	.36
Trichlorethylene, 50 gal dr...lb.	.10	.10½	.10	.10½	.10	.10½
Triethanolamine, 50 gal drs...lb.	.35	.38	.35	.42	.40	.42
Tricresyl Phosphate, drs.....lb.	.25½	.26	.25½	.26	.26	.45
Triphenyl guanidine.........lb.	.58	.60	.58	.60	.58	.60
Phosphate, drums.........lb.	.50	.65	.50	.65	.50	.70
Tripoli, 500 lb bbls......100 lb.	.75	2.00	.75	2.00	.75	2.00

*&10

	Current Market		1932 Low	1932 High	1931 Low	1931 High
Tungsten, Wolframite..per unit.	10.00	11.00	10.00	11.75	11.00	11.75
Turpentine carlots, bbls.....gal.	.....	.41¾	.39	.47¾	.36½	.57
Wood Steam dist, bbls....gal.	.....	.41	.42	.46	.38	.61
Urea, pure, 112 lb cases......lb.	.15	.17	.15	.17	.15	.17
Fert. grade, bags c.i.f......ton	.....	82.60	.....	82.60	.....	82.60
c. i. f. S. points........ton	.....	82.60	.....	82.60	.....	82.60
Valonia Beard, 42%, tannin bags..................ton	.....	29.00	28.50	34.00	33.00	40.00
Cups, 30-31% tannin.....ton	.....	19.00	19.00	23.50	22.50	25.00
Mixture, bark, bags......ton	.....	22.00	22.00	26.00	25.00	31.00
Vermillion, English, kegs.....lb.	1.28	1.40	1.28	1.80	1.53	1.80
Vinyl Chloride, 16 lb cyl.....lb.	.....	1.00	.....	1.00	.....	1.00
Wattle Bark, bags..........ton	.....	27.00	26.00	33.00	32.00	41.00
Extract 55%, double bags ex-dock..................lb.	.05	.06½	.05	.06½	.05	.06½
Whiting, 200 lb bags, c-1 wks ....100 lb.	.85	1.00	.85	1.00	.85	1.00
Alba, bags c-1 NY........ton	.....	13.00	.....	13.00	.....	13.00
Gilders, bags c-1 NY...100 lb.	.....	1.35	.....	1.35	.....	1.35
Xylene, 10 deg tanks wks...gal.	.....	.29	.....	.29	.....	.29
Commercial, tanks wks...gal.	.....	.26	.....	.26	.24	.30
Xylidine, crude.............lb.	.36	.37	.36	.37	.36	.37
Zinc Ammonium Chloride powd., 400 lb bbls.............lb.	.05	.05½	.....	5.75	5.25	5.75
Carbonate Tech. bbls NY..lb.	.09½	.11	.09½	.11	.10½	.11
Chloride Fused, 600 lb drs wks..................lb.	.05	.05¾	.05	.06	.05¾	.06
Gran, 500 lb bbls wks.....lb.	.05⅞	.06	.05⅞	.06	.05⅞	.06
Soln 50%, tanks wks...100 lb.	2.25	3.00	2.25	3.00	2.25	3.00
Cyanide, 100 lb drums.....lb.	.38	.39	.38	.39	.38	.39
Dithiofuroate, 100 lb dr....lb.	.....	1.00	.....	1.00	.....	1.00
Dust, 500 lb bbls c-1 wks...lb.	.....	.04½	.041	.0525	.0515	.07
Metal, high grade slabs c-1 NY...............100 lb.	.....	3.495	2.87	3.52	3.50	4.45
Oxide, American bags wk...lb.	.....	.05¾	.0485	.07	.06½	.07
French, 300 lb bbls wks...lb.	.08⅝	.11⅝	.08⅝	.11⅝	.09⅝	.11⅝
Perborate, 100 lb drs......lb.	.....	1.25	.....	1.25	.....	1.25
Peroxide, 100 lb drs.......lb.	.....	1.25	.....	1.25	.....	1.25
Stearate, 50 lb bbls........lb.	.16	.17	.16	.22	.18½	.23
Sulfate, 400 bbl wks.......lb.	.03	.03½	.03	.03½	.03	.03½
Sulfide, 500 lb bbls........lb.	.12	.13	.12	.13½	.13	16½
Sulfocarbolate, 100 lb keg..lb.	.21	.22	.21	.24	.22	.30
Zirconium Oxide, Nat. kegs...lb.	.02½	.03	.02½	.03	.02½	.03
Pure kegs................lb.	.45	.50	.45	.50	.45	.50
Semi-refined kegs.........lb.	.08	.10	.08	.10	.08	.10

Oils and Fats

	Current Market		1932 Low	1932 High	1931 Low	1931 High
Castor, No. 1, 400 lb bbls....lb.	.....	.10	.09½	.10¼	.10	.12
No. 3, 400 lb bbls.........lb.	.08¾	.09½	.08¾	.10½	.09½	.11¾
Blown, 400 lb bbls.........lb.	.....	.....	.11½	.12½	.12½	.14
China Wood, bbls spot NY...lb.	.05¼	.05½	.05¼	.07¾	.07	.07½
Tanks, spot NY.........lb.	.04½	.05	.04½	.06⅞	.06	.07
Coast, tanks............lb.	.04¼	.04½	.04¼	.06½	.05½	.06½
Coconut, edible, bbls NY....lb.	.....	.10¾	.....	.10¾	.....	.10¾
Ceylon, 375 lb bbls NY....lb.	.04	.04½	.04	.04¾	.04⅝	.06½
8000 gal tanks NY......lb.	.03	.03¼	.02⅞	.03⅞	.03⅞	.06
Cochin, 375 lb bbls NY....lb.	.04½	.04¾	.04½	.06	.05⅝	.07
TanksN Y..............lb.	.04	.04¼	.03½	.05	.04⅝	.05⅜
Manila, bbls NY..........lb.	.04	.04¼	.04	.05	.04⅝	.07
Tanks NY..............lb.	.03¼	.03½	.03¼	.04	.03⅝	.05⅛
Tanks, Pacific Coast.....lb.	.....	.03	.02⅞	.03½	.03	.05
Cod, Newfoundland, 50 gal bbls ....gal.	.22	.24	.21	.30	.26	.48
Cod Liver see Chemicals.......						
Copra, bags, N. Y...........lb.	.0175	.019	.0175	.0235	.0195	.0325
Corn, crude, bbls NY........lb.	.....	.05¼	.04⅝	.09	.05⅜	.09
Tanks, mills............lb.	.02¾	.03	.02¾	.04½	.03⅞	.07⅛
Refined, 375 lb bbls NY...lb.	.....	.06¼	.05½	.07	.06¾	.10⅛
Tanks.................lb.	.05⅞	.06	.05	.08¾	.08	.08¾
Cottonseed, crude, mill.......lb.	.....	.03½	.02⅝	.04⅛	.03	.07
Degras, American, 50 gal bbls NY...................lb.	.02½	.03	.02½	.04	.03½	.04½
English, brown, bbls NY...lb.	.02⅞	.03½	.02⅞	.04	.03⅞	.05
Greases, Brown.............lb.	.02	.02¼	.01⅞	.02¾	.02	.04¼
Yellow..................lb.	.02¼	.02½	.01⅞	.03	.02	.05
White, choice bbls NY.....lb.	.03½	.03¾	.02	.04½	.03½	.05⅜
Herring, Coast, Tanks......gal.	.11	.12	.....	.....	.....	.....
Lard Oil, edible, prime.......lb.	.08½	.08⅞	.08½	.10	.10¾	.13
Extra, bbls.............lb.	.07½	.07⅝	.05¾	.07¾	.07	.10
Extra No. 1, bbls.......lb.	.06⅝	.06⅞	.05½	.07	.06½	.09¾
Linseed, Raw, five bbl lots...lb.	.....	.078	.061	.078	.077	.102
Bbls c-1 spot...........lb.	.....	.07	.053	.07	.069	.098
Tanks.................lb.	.....	.064	.047	.064	.063	.092
Menhaden Tanks, Baltimore.gal.	.09½	.10	.09½	.20	.14	.22
Extra, bleached, bbls NY..gal.	.36	.37	.36	.40	.38	.53
Light, pressed, bbls NY...gal.	.27	.27½	.25	.34	.33	.38
Yellow, bleached, bbls NY.gal.	.30	.30½	.30	.37	.30	.42
Neatsfoot, CT, 20° bbls NY...lb.	.11¾	.12	.11½	.13½	.13½	.16
Extra, bbls NY...........lb.	.06½	.06¾	.05¾	.07	.07	.10
Pure, bbls NY...........lb.	.07¾	.08	.07¾	.09	.09½	.12
Oleo, No. 1, bbls NY........lb.	.....	.06	.05⅝	.07	.06⅝	.08
No. 2, bbls NY..........lb.	.....	.05¼	.04¾	.06	.05¾	.08
No. 3, bbls NY..........lb.	.....	.06½	.....	.06¾	.06¾	.09
Olive, denatured, bbls NY...gal.	.51	.54	.51	.65	.59	.80
Edible, bbls NY.........gal.	1.25	1.50	1.25	2.00	1.50	2.00
Foots, bbls NY...........lb.	.04½	.04¾	.04¼	.05	.04½	.06¾
Palm, Kernel Casks.........lb.	.....	.04	.035	.04⅝	.04⅛	.06½
Lagos, 1500 lb casks.......lb.	.....	.03¼	.03	.05	.04	.06
Niger, Casks.............lb.	.03	.03¼	.03	.03½	.03½	.05½
Peanut, crude, bbls NY......lb.	.03	.03¼	.02¾	.04½	.03⅞	.05
Refined, bbls NY.........lb.	.....	.08½	.08¼	.09	.08½	.14
Perilla, bbls NY.............lb.	.04½	.04¾	.03¾	.05¾	.05½	.11
Tanks, Coast...........lb.	.03¾	.04	.03½	.05	.05	.09
Poppyseed, bbls NY........gal.	1.60	1.70	1.60	1.75	1.70	1.75
Rapeseed, in bond, bbls NY.gal.	.....	.31	.....	.....	.....	.....
denatured, drms, NY.....gal.	.....	.33	.....	.....	.....	.....
Red, Distilled, bbls..........lb.	.06⅛	.06½	.06⅛	.07	07⅝	.09
Tanks.................lb.	.05¼	.05½	.05¼	.06	.06½	.08½
Salmon, Coast, 8000 gal tks.gal.	.11	.12	.11	.19	.19	.22
Sardine, Pacific Coast tks...gal.	.09½	.10	.09½	.17½	.17	.19
Sesame, edible, yellow, dos...lb.	.....	.09½	.08½	.09½	.08½	.10¾
White, dos...............lb.	.10	.11	.10	.11	.10	.12
Sod, bbls NY...............gal.	.....	.40	.....	.40	.....	.40
Soy Bean, crude..............						
Pacific Coast.............lb.	.032	.035	.02¾	.03½	.03⅝	.08
Domestic tanks, f. o. b. mills, ...lb.	.027	.027	.03	.032	.032	.07
Crude, bbls NY.........lb.	.04	.04¼	.03¾	.05	.04⅝	.08
Tanks NY..............lb.	.....	.03½	.03¼	.04½	.04¼	.08
Refined, bbls NY..........lb.	.04½	.05	.04½	.06	.058	.09
Sperm, 38° CT, bleached, bbls NY..................gal.	.68	.70	.68	.70	.68	.85
45° CT, bleached, bbls NY.gal.	.63	.65	.63	.65	.63	.80
Stearic Acid, double pressed dist bags..................lb.	.07½	.08	.07½	.09	.08½	.11
Double pressed saponified bags ....lb.	.08	.08½	.07	.08½	.08	.12
Triple, pressed dist bags..lb.	.10¼	.10¾	.10½	.11	.11	.14
Stearine, Oleo, bbls..........lb.	.03⅞	.04	.03¾	.06	.05½	.08¾
Tallow City, extra loose......lb.	.02¼	.02½	.02¼	.03⅝	.02⅞	.04
Edible, tierces............lb.	.....	.03½	.03⅛	.04½	.03⅞	.06
Tallow Oil, Bbls, c-1 NY...lb.	.05¾	.06	.05¾	.07½	.07	.08¾
Acidless, tanks NY........lb.	.06	.06¾	.06	.09	.07⅞	.09
Vegetable. Coast mats.....lb.	.06	Nom.	.06	Nom.	.06½	Nom.
Turkey Red, single bbls......lb.	.06¼	.07½	.06¼	.09	.07	.10
Double, bbls..............lb.	.08	.09	.08	.11	.09	.10
Whale, bleached winter, bbls NY..................gal.	.....	.74	.....	.74	.....	.74
Extra, bleached, bbls NY..gal.	.51	.52	.51	.60	.58	77½
Nat. winter, bbls NY.....gal.	.45	.46	.45	.55	.53	.72



LARGER THAN USUAL
are Baker's Tin Crystals--

ALSO "Purer" than usual, because they are made synthetically from the two elements Tin and Chlorine. The best grade of Commercial Metallic Tin is subjected to partial purification to remove the As, Cu, Cd,—the chief impurities. It is then acted upon in a special apparatus by Chlorine, from a liquid chlorine tank car. The result is a grade of "Technical" Stannous Chloride that actually is better than the "C. P." of just a few years ago.

¶ Because the crystals are very much larger than usual, they last five to ten times longer in storage than others. This is of importance to the user because he can make larger-quantity purchases at lower prices. Futhermore, large crystals have far less total "oxidizable" surface, so dissolve quicker, saving valuable time and giving better results.

The chemical, textile, dye, mirror, metallurgical and sugar industries appreciate the purity and uniformity of Baker's "Tin Crystals".

In the new "Baker's Analyzed" catalog, just off the press, are listed chemicals to meet EVERY "A.C.S." specification. Send for a copy.

J. T. Baker Chemical Co.
PHILLIPSBURG, N. J.

NEW YORK	CHICAGO	PHILADELPHIA
420 Lexington Ave.	624 S. Michigan Blvd.	220 S. 16th St.

MADE BY THE MANUFACTURERS OF
"Baker's Analyzed"
C. P. CHEMICALS AND ACIDS